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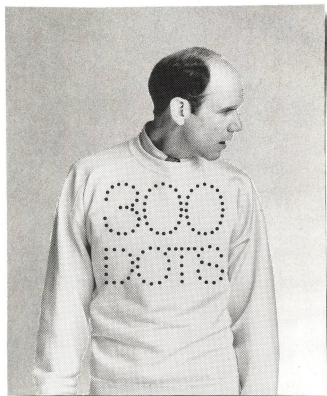


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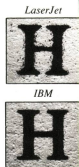
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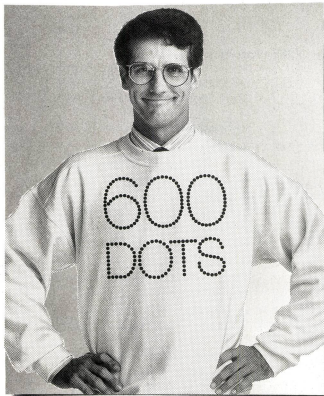


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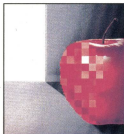
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Diffuse lighting

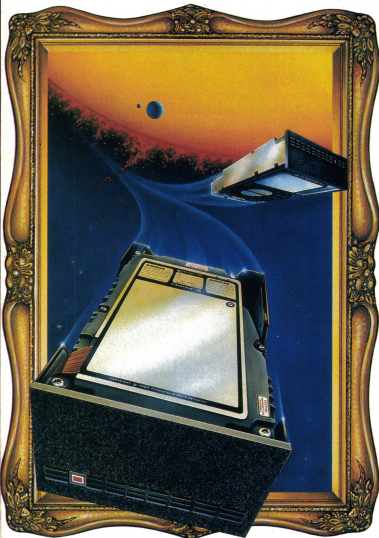
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This month's news overview covers IBM and Intel's accord to jointly enhance 80x86 architecture chips; AMD's 486 chip; the temporary delay of Windows 3.1; Microsoft's development future; and NetComm's move into the European market.

PSA's enquiry into software pricing

Major business software developers, along with the BSAA, have spent the past few weeks presenting submissions to the Prices Surveillance Authority (PSA)'s Enquiry Into Software Prices.

The conclusions and recommendations from the enquiry focused primarily on the concept of intellectual property and those characteristics of computer software which make it different from other works protected under the Copyright Act 1968, such as books and records. The enquiry defines some of these differences as the regular upgrading of product; the tendency for applications to be customised (as opposed to books, which are generally released unchanged); and the user requirement for support and training, which are not characteristic of other media covered by the Act.

The enquiry also recognised that the software industry is a relatively new one, involving high levels of technological innovation and requiring substantial investment, in comparison with mature market products such as books, and thus the costs of software are reflective of this investment and continued support.

Although the enquiry registered the finding that software prices in Australia are, on average, higher than

in the UK and the US, it also concluded that, 'all factors considered, we believe that the Australian information technology marketplace is one of the most competitive in the world'.

A survey of street prices for software conducted by the BSAA supports the enquiry's pricing investigation. Notable exceptions to the rule include Ami Pro Version 2.0, which is 32.3 per cent less expensive here than in the UK, and Microsoft Word for Windows, which is 15.7 per cent less expensive.

The differentials between the costs of software in Australia and the US are accounted for in the higher costs of doing business in Australia. Margins account not only for vendor profit, but for transport and distribution costs. The large geographic spread of a proportionately smaller market means that in Australia allowances must be made for service as well as supply of product.

The impressions left by the enquiry seem to be that market forces are clearly capable of determining the most appropriate distribution and pricing structures, and the PSA is inclined to recognise the presence in Australia of so many large overseas developers as a positive rather than negative influence on the

development of a local industry.

Already, software represents a major export earner for Australia, with 1991 exports of \$295 million; 42 per cent of the total IT exports. Investment from leading international companies can only see this figure grow. Apart from the contribution made to exports, the PSA recognised the significant proportion of people employed in software development and distribution, or ancillary industries, such as training, support and marketing.

The enquiry also concluded that global profit figures, although often quoted as evidence of software being unjustifiably expensive, are irrelevant in an assessment of software pricing in Australia. Prices of business PC software have fallen in real terms over the past four years, and figures from the Business Council of Australia found that the profitability of the major IT industry companies in Australia has fallen to around three per cent since 1990 in comparison to a national industry average of seven per cent.

Software was recognised as a significant contributing factor in the steady erosion of hardware prices experienced in the industry over the past two years, and to the growth of the PC as a powerful busi-

Newsbriefs

◆ Fifteen years ago, consumers were turning their TVs into monitors for home computers; now PCs are being used as TVs. Half a dozen companies are set to introduce a new add-in circuit board that will allow almost any monitor to display TV signals.

The new PC TV could be the first time many ordinary PC users will experience the potential of multimedia, where text, sound, motion and graphics are combined on a single computer. While the circuit boards have been around for several years, the new generation boards will typically cost less than half the price.

One analyst said that PC TV will not catch on until the next generation of products, scheduled to be released in 1993, allow users to digitally manipulate the snippets of action — allowing users with video cameras to send each other video mail messages.

◆ In the works at the WordPerfect software firm is the next DOS-based version of its word processing product, expected to come out for the company's nine million users late this year.

WordPerfect 6.0 for DOS will provide users with a new graphical user interface (GUI) as well as the old standby

Cont...



Data in a flash with Intel's flash memory

Intel Australia last month announced the availability of a number of new non-volatile Flash Memory products, hybrids of EEPROM (Electrically Erasable Read Only Memory) technology. The way Flash differs from EEPROM is that it is possible to erase small (64K) segments of memory and then rewrite them. Intel is currently shipping Flash Memory cards in 4, 8, 10 and 20M configurations.

Intel's Flash cards conform to the PCMCIA interface standard and are compatible with Microsoft's Flash File System. A number of manufacturers have committed to include PCMCIA slots in laptops, notebooks and palmtops, and two companies, Sharp and Commodore, are actually shipping product.

Intel's Flash product line is intended to replace hard disk drives in notebook and palmtop computers, offering faster access time (either 85 or 120ns) and consuming much less power.

While Intel has stated that any given block of memory (64K) can only be rewritten 100,000 times, it does limit the type of memory applications that Flash can serve.

Paul Paradigm

ness tool. Increasingly sophisticated off-the-shelf applications have made available to PC users capabilities which previously required large systems.

The enquiry also recognised the significant threat posed to both local and international developers by widespread software theft, or piracy. Illegally acquired software is conservatively estimated by the BSAA to erode up to 50 per cent of the market for PC software in Australia, and the scope and nature of prosecutions currently being undertaken by the major developers confirm this estimation.

The PSA's recommendations are in line with these findings. They also involve support for industry moves to protect itself against copying

and illegal use to encourage the growth of a local industry. This will maintain importation provisions of the Copyright Act to promote the viability of the local industry, while adhering to the 'own use' provisions of the Copyright Act which allow importation strictly for own use and not for sale or commercial use.

Widespread feeling among associations and industry groups which participated in the submissions was a strong support for the PSA's initiative in the enquiry, but there was a sense of disquiet that the terms of the enquiry had precluded in many instances the presentation of evidence which lay at the root cause of the high cost of software. Presenters in general felt that they could have made a valuable contribution in defining

the terms of reference rather than merely having been called to answer questions, and that an investigation of the purportedly high cost of software might have been better dealt with in the context of the causes of current software pricing. Issues such as copying, piracy and unlawful importation mean that Australian distribution channels are missing revenue, while support lines are still being taken up with queries and problems. Redressing the balance of originally acquired software could see the real cost of business software fall, according to many people at the enquiry.

Another particular cause for concern was the discussion about the lifting of parallel importation restrictions. There is strong industry feeling that the lifting of restrictions will encourage international companies to withdraw support, and concerns have been raised about what this would mean in terms of continuity and adequate levels of support for local consumers.

Helen Dancer

DEC goes direct with new 386SX PC

Digital Equipment Corp Australia has brought direct marketing to brand-name personal computers. The DECpc 325sx is being promoted through extensive press advertising, and orders are taken through the company's DECdirect 008 number. Older models are still sold through existing distribution channels, but it is anticipated that new 486 and 486SX systems expected in the near future will be marketed by DECdirect.

The \$2960 DECpc 325sx is a 386SX-based system with 2M of RAM, a 52M hard drive, Super VGA display, DOS 5.0 and Windows 3.1. It is also available with a 105M disk and 8M of RAM for \$3780. Although it is presently being built at Digital's Taiwanese plant, the possibility of future local assembly has not been ruled out.

Newsbriefs (cont...)

character interface. This GUI will be fastened by a customisable button bar. The upcoming product will also feature fax and E-mail capabilities that will let users send and receive mail while working within the word processor. Other capabilities include enhanced tables and colour support, improved graphics manipulation and improved document-management features. This is the latest major upgrade to the word processing program since WordPerfect 5.1 came out in November 1989.

● Hewlett-Packard has just taken steps with a new 'world's smallest' hard drive that it hopes will have the company sprinting ahead of the pack of competitive computer-industry rivals.

While many larger corporations are being left in the innovative dust by small start-ups willing to take chances, HP has announced it will introduce this month the world's smallest disk drive — one that stores information on a hard disk that is 1.3in in diameter.

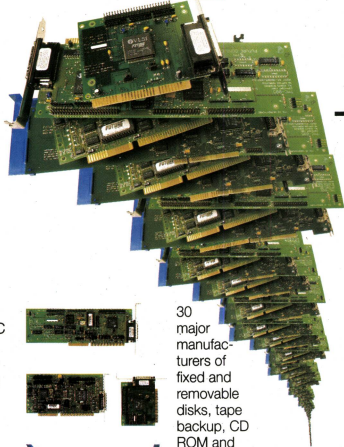
The new drive is expected to be used in the firm's 95LX palmtop computer. HP is hoping the disk drive will be used in other pocket-sized computers, and in a new breed of cellular phones that will include voice mail and fax capabilities. HP's announcement, scheduled for June 8, comes before many firms start to ship a 1.8in hard drive, which emerged last spring as the smallest hard drive to date.

● Low-cost clone users are having problems running Windows 3.1 and OS/2 2.0, and IBM and Microsoft are pointing to poor-quality memory chips. Because of the problems, both companies have issued a warning to clone users to beware of potentially data-robbing memory parity errors.

OS/2 users have reported that it has been impossible to install the system software on low-end PC, while other clone

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The direct marketing push follows similar efforts by the company in the US, and is part of a long-term plan to reduce the size of its sales force in favour of telemarketing and EDI. Digital officials said they expect as much as 30 per cent of revenue to be generated through these channels.

Here comes PowerPC

A RISC-based personal computer from the IBM-Apple alliance may come about faster than both firms expected — possibly before the end of the year — thanks to development advancements.

During the next seven months, these achievements will be revealed to push the planned PowerPC machine into the market faster than the industry thought possible. These PCs will be able to run Macintosh applications native-

ly, due to a deal with an emerging Bell Labs spin-off called Echo Logic. This new firm will provide binary code conversion that will allow Macintosh applications to run natively on AIX.

Accelerated RISC chip products from IBM and Motorola also came about more easily than first thought, and one IBM spokesperson said the firm expects to sample chips by the end of the year. The two firms grafted the input/output interface from Motorola's 88110 chip onto IBM's Power chip, according to the spokesperson.

Edittech International

Apple given second chance in look-and-feel lawsuit

Apple Computer's four-year court battle with Microsoft

and Hewlett-Packard (HP) is still alive after a US federal judge ruled that he will reconsider his month-old decision with "great reluctance." The US judge agreed to reconsider his original ruling which had appeared to have gutted Apple's case. The judge also criticised Apple's lawyers for waiting a month to file the papers.

Because of the judge's agreement to listen to arguments again, the case will continue until mid-June. The judge gave HP 20 days to file additional documents, and Microsoft already has a response to Apple's request.

The case began in 1988, when Apple sued Microsoft and HP for emulating the 'look and feel' of the Macintosh personal computer. On April 14, this year, Judge Vaughn Walker of the US District Court dismissed much of Apple's argument in a 'look and feel' copyright lawsuit brought against rival firms Microsoft and HP. The abrupt ruling from the bench took the entire industry by surprise.

For Apple, the ruling was taken as a hint of what may well be an upcoming defeat of its GUI copyright lawsuit against its two rivals. The four-year-old lawsuit caught the attention of the computer industry because Apple claimed that Windows breached its graphical user interface copyrights for Macintosh PCs. In previously submitted pre-trial documents and statements, Apple believed it should receive damages from Microsoft in the vicinity of \$5.5 billion.

Walker had ruled that all the visual displays in dispute in Windows 2.0 and many of those in Version 3.0 were not protectable under Apple's copyrights. This announcement was unexpected, and it is unusual in California for judges to make oral rulings in cases. Apple was contesting a battle in the murky grounds of copyright law, a legal world of entangling judicial complexities and often questionable definitions.

Copyrights are designed to

Newsbriefs (cont...)

users have said that Windows 3.1 has caused data-robbing parity errors.

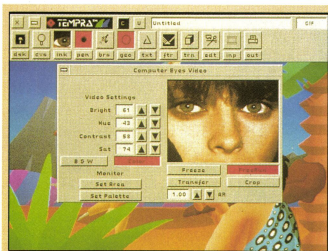
IBM acknowledges that some machines may not be able to run OS/2 because of marginal memory (memory from less mainstream manufacturers that have lower quality control standards, according to IBM officials). One clone manufacturer is recommending users exchange the low-quality memory sometimes installed by resellers for high-quality, more expensive memory modules.

Lotus is developing a visual programming application called Notebook that lets you integrate relational data with Notes data. The company demonstrated how you can query sales data in a Sybase database and place it live into a window next to a Notes database using visual programming methods. Applications created with Notebook can be distributed through Notes. Lotus chief technical officer John Landry said that Notebook offers CASE, "where the graphical representation of the data is not just a description of the system, it is the system."

Go's PenPoint mobile operating system, which was released in April, could support cursive-handwriting recognition by the end of this year, thanks to an arrangement with Paragraph International, a Russian-American developer of handwriting-recognition technology.

Exactly two years after it first announced the project, Quarterdeck Office Systems released DESView/X, its 32-bit operating system that lets 386SX or higher PCs run graphical X Windows System programs residing on a Unix host. DESView/X also lets the same Unix hosts or X terminals run DOS or Windows programs residing on the PC. "Getting Microsoft Windows to run remotely on a Sun workstation was the final step," said Therese Myers, Quarterdeck's president.

End



Lako Vision targets PC paint market

Melbourne-based distributor Lako Vision has released Tempra GIF, a cut-down version of its imaging editing product Tempra Pro. According to company officials, Lako Vision is hoping to capture the PC paint market currently dominated by ZSoft's Paintbrush and Electronic Arts' Deluxe Paint.

The product provides a variety of standard paint tools, photorealistic image processing effects and transformation effects for \$150. Commenting on the attractive pricing, Lako Vision's marketing manager Evan Kourambas said, "With Tempra GIF, users can have an industrial-strength tool with a custom-designed GUI for editing colour images on the PC. No longer do they have to make do with the toy products associated with this price point."

Artists can utilise the washing, blending and airbrushing facilities, as well as the ability to antialias, tint or soften an image.

Lako Vision can be contacted on (03) 525 2677.

Catbie Kennedy

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protect an expression or an idea, but the idea itself is still pretty much up for grabs. Apple, in many ways, was fighting an uphill battle in trying to prove that a function such as overlapping windows could be defined as 'an artistic expression'.

One strike against Apple was that the company did not do a good job on showing which of its building blocks for the Macintosh GUI were legally proprietary. Another strike was that the company developed much of its technology from work done previously by Xerox's Palo Alto Research Center.

Despite the ominous way the suit has turned against Apple, however, the officials claim the firm will continue to pursue the case with two more hearings scheduled, saying it may even ask the court for a reconsideration of Walker's April 14 decision.

"We continue to look forward to an opportunity to demonstrate that, as a matter of fact, Microsoft and Hewlett-Packard exceeded any license and copied the overall appearance of the Macintosh interface, which is protectable under the copyright law," insisted Edward Stead, Apple's general counsel.

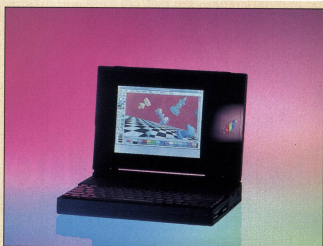
The three companies involved in the case will most likely not change business operations because of the recent decision. And if Apple loses the case in the final outcome, the result will probably not have any major impact on the software industry either. It will just be business as usual.

After the shock ruling, Apple CEO John Sculley said the firm's Macintosh business was still going strong and would continue to expand its product line beyond Macintosh PCs.

Microsoft officials said the company will continue to exploit the technology, believing that Apple will, in the final outcome, lose the lawsuit.

John Stark, an attorney representing HP, commented: "Apple's case has been gutted, there's nothing left."

For HP, the April 14



Renard quick to join colour portable computing lineup with the X300C

Joining the fray of companies to offer colour portables, Renard recently released a 386SX notebook that the company expects will sell for a street price of around \$6300.

The X300C, which comes standard with 4M of RAM, is powered by an AMD 25MHz SXL microprocessor. Storage options include a 40, 80 or 120M hard disk drive and an internal 1.44M floppy disk drive, and the notebook also features an external SCSI/2 port for attachment to a CD-ROM, tape back-up unit or external hard disk.

The colour passive LCD screen displays 16 colours at VGA resolution. A \$4300 mono version is also available, which can be later upgraded to colour.

Both units come with a two-year warranty, and free support is available on a 008 number.

Renard's announcement follows hot on the heels of the release of AST's colour notebook range in Australia.

Renard can be contacted on 008 032 352.

Catie Kennedy

decision was especially glowing. Judge Walker overturned 43 of the firm's 44 NewWave features in dispute by Apple, said Andrew Ould, a spokesperson for HP. The only feature left to be decided on is the HP trash-can icon, "which doesn't resemble the Apple icon," he insisted.

"It's certainly good news for NewWave. We think it's a major victory for Hewlett-Packard, although we know the case is not over with yet," Stark said.

HP does not plan to change its marketing plans with NewWave, and in fact the firm recently released Version 4.0 of the product (see review in First Looks), which Ould said is a sign that the firm was not intimidated by Apple's suit.

A Microsoft representative said that the Walker decision gives the firm a favourable outlook on the outcome of the case.

"While the case is not over, we have taken a big step forward," said William Neukom, Microsoft vice-president of law and corporate affairs. "We look forward to his written order and will have a more comprehensive response after we've studied it."

Of course, with billions of dollars at stake, Apple will continue fighting valiantly for its GUI copyright, probably asking for an appeal. But, like a modern-day corporate Don Quixote, the firm may only be battling windmills.

Martin Cheek
Edittech International

Apple Australia's fund to boost exports

Apple has launched a \$10 million investment fund under the Federal Government's Partnership for Development Programme. Announcing the fund, Apple Australia's managing director, David Strong, said, "The aim is to have our funds act as a catalyst to highlight to local investment houses that high-tech investments can be successful in Australia.

"Many promising products are being aborted early on because start-up operations cannot find the funds to continue work. The ADF aims to address this issue directly," he added.

The first investments will be made at the end of this year, with the funds being placed over a three-year period. Areas of interest include multimedia systems and courseware development and distribution; applications development; software publishing and distribution; hardware and software marketing and distribution; telecommunications and networking products and services; and Apple-related OEM products.

According to Strong, the fund will look for unique and potentially world-class products with export potential. Other criteria will include a business model and management practices that would allow candidate companies to become and remain internationally competitive. The fund manager has yet to be appointed, but a shortlist has been prepared.

Apple president and CEO Mike Spindler, visiting Australia for the launch of the fund, said the company believes there are good prospects for Australian exports to the Asian region during the next few years.

The company also hopes to acquire technologies through the programme. "Apple, as a global company, recognises that nations have areas of product-development

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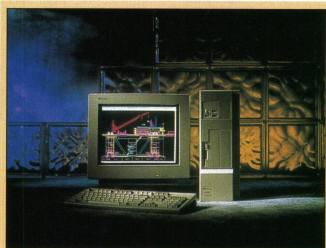
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HP launches 'trouble-free' PC range

To coincide with the announcement of its 'trouble free personal computing strategy', Hewlett-Packard (HP) recently launched additions to its PC range.

Beefing out its family of 'network-ready' PCs, HP delivered the Vectra 386/25N, which is designed to address the specific requirements of systems administrators and end users in networked environments.

Running on a 25MHz 386SX processor, the unit comes standard with 4M of RAM, two 16-bit slots, a built-in network interface card, and one 25-pin parallel port and two 9-pin serial ports. The system board can be upgraded to a 486. Pricing was not available at press time.

At the high-end, HP announced the new 486U desktop PC series which, company officials claim, provides users with workstation speed and graphics performance when using leading software applications.

The significant video-performance improvements result from HP's Ultra VGA+ video subsystem, which features an integrated, high-speed, 32-bit local bus video implementation with S3 graphics accelerators that eliminate the video bottlenecks.

The subsystem and HP's latest VGA 17in colour monitor support up to a 1024 by 768 resolution at 16 or 256 colours. The 486U series has eight upgrade options.

Prices (excluding monitor) will range from approximately \$5400 for the 25MHz version to \$7600 for the 50MHz unit. The monitor is expected to cost around \$2600.

Hewlett-Packard can be contacted on (03) 895 2895.

Cathie Kennedy

excellence that complement our own efforts," said Spindler.

Stephen Withers

Compaq bails out of RISC-Y business

Compaq has resigned from the Advanced Computing Environment (ACE) initiative to follow market trends away from RISC-based systems and focus on the next generation of operating systems featuring Intel-based technology.

The ACE initiative, which Compaq cofounded in 1991, established a strategic

relationship between a number of hardware and software vendors, notably DEC, Microsoft, MIPS Computer Systems and Zenith, to promote a common access, transparent product strategy that would benefit users wanting cross-vendor compatibility. The initiative centred its development on the MIPS RISC processor microprocessor-based computer platform, and mandated interoperability between PC, ARC and Unix environments.

Compaq, however, has noted an overall lack of

market acceptance for the RISC-based product strategy, and feels that its move away from this focus is a response to a fundamental change in the way customers view RISC-based products.

According to managing director Ian Penman, the market is moving along on the tide of Intel platforms, and Compaq must concede, if it is to maintain its aggressive market stance, that users are less willing to consider RISC-based alternatives.

The decision to resign is not, however, indicative of Compaq's dissatisfaction with the impact ACE has had on the development of the industry since its formation, he said, and points out the benefits to the Unix community of the agreement last November on a consistent API between OSF1 and SVR4-based systems. Such agreements, Penman believes, are a direct result of the strategic alliances formed by ACE, and he calls the initiative a "major catalyst of change."

The decision echoes the market's apparent convergence on Intel-based systems, and is a de facto acknowledgement of Intel's strengthening position as an emerging standard, with vendors such as Sun and NeXT both working towards providing new product versions for Intel customers.

There is already such a lot of investment in the Intel platform that, particularly given the economic downturn, companies still spending money on technology are reluctant to go beyond the bounds of what they know and can easily accommodate into their existing frameworks.

Helen Dancer

Challenger to ACE

Secret talks between US PC firms will likely lead to a new standard for high-end PCs set to challenge the troubled ACE consortium.

The new PC standard would let manufacturers build systems capable of competing with ACE-made workstations

based on RISC chips. It would reportedly be able to run a huge installed base of DOS-based software and be optimised to run the new 32-bit operating system from IBM and Microsoft, and OS/2 and Windows NT.

Intel is very interested in the new PC specification, since it will help stem the loss of customers towards RISC-based systems. Intel's upcoming chip, P5, will be sampled by top customers in the next few months. And Compaq and DEC claim they will have the first P5 systems on the market.

Industry sources say IBM, Compaq, Dell, Microsoft and Intel have established a long list of specifications that will become part of the high-end PC standard.

The increasing support for a high-end PC standard based on Intel's 80x86 architecture is related to the failure of the ACE consortium to define a similar standard for Intel-based systems. ACE was hit by the defections of Compaq and the Santa Cruz Operations.

Charlotte Klopp
Edittch International

Lotus and Novell strengthen ties with Notes NLN for NetWare

In a deal that represents the most substantial collaboration since their failed merger two years ago, Lotus Development and Novell are integrating Lotus' Notes group communications package into the NetWare environment. Lotus will develop a version of its client/server Notes package that will run natively on NetWare servers and support Novell's MHS (Message Handling Services) messaging protocol. The companies will also co-operate on marketing efforts, including joint training on Notes for Novell's pool of value-added resellers (VARs).

Notes executes only on OS/2 1.x servers and OS/2

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PM (Presentation Manager) or Windows clients. Thus, customers who want to use Notes in the NetWare environment must run it on a separate OS/2-based server that communicates with NetWare via an OS/2 requester. By rewriting Notes as an NLM (NetWare Loadable Module) for the 32-bit NetWare 386, Lotus will let customers run the server component of the package without an OS/2 machine.

Lotus will make the move to NetWare in several stages. First, Notes 3.0, as well as the next version of cc:Mail (both expected before the end of this year), will add support for Novell's NetWare IPX/SPX transport protocols. (Lotus officials have said the company will add support for Mac clients in the same release.) In a separate development, Lotus will deliver Unix client and server versions of Notes in early 1993.

Late in the first half of 1993, Lotus plans to ship the Notes NLM, which will also fully support MHS and NetWare Global Messaging, as an alternative to the Notes messaging engines. Users will be able to use multiple mail transport concurrently, according to Lotus officials. And by supporting MHS, Notes will be able to connect with any back-end mail system that NetWare supports.

In roughly the same time frame, Lotus and Novell will be moving to use the emerging Vendor-Independent Messaging (VIM) standard, of which they are key proponents and developers. Both companies also stated that they are migrating towards the use of X.500 global-directory services in their mail and messaging products. The Notes NLM will require NetWare 3.2, which is scheduled to ship in the fourth quarter of this year.

Andy Reinhardt

Univel to kick off desktop Unix product

Univel has outlined its desktop strategy for its Unix

version code-named 'Destiny', planning to tie the NetWare and Unix together on Intel platforms as their kick-off product. Meanwhile, the company is also seeking customers such as Hewlett-Packard, IBM and Sun to support Destiny with their workstation products.

The up-coming off-the-shelf Destiny is expected to compete against Microsoft's 32-bit Windows NT operating system. The new system, a version of USV4, will include both the Motif and Open Look graphical user interfaces, said Ry Schwark, a spokesperson for Unix System Laboratories, a parent company of Univel.

Currently in beta testing, the product is expected to ship in June or July for Intel processors, he said. Later versions will come out for Unix platforms from MIPS Computers Systems, Sun Microsystems, Motorola and other members of the ACE consortium.

The first product from Univel, called UnixWare, will run on the Intel platform and provide Novell NetWare services that will be joined to Unix.

"What we've done is take the time-tested USV4 and really emphasised its ease of use and modularity so that we have a product that spans from desktop to supercomputers," Schwark said.

USL is also now negotiating with IBM, Hewlett-Packard and DEC to persuade these firms to standardise the desktop Unix to their own Unix products. None of these firms will provide comment on the talks. However, the three firms do not have a desktop Unix product with low memory requirements at present, which makes it hard for personal computers running in client/server environments to use their operating systems. One analyst believes that such an agreement will help promote momentum for Unix in the desktop market.

"I think there is a market for the product," said John

Morrell, senior analyst for Unix at International Data Corp. "Unix is going to take a very good turn on the desktop," he said.

However, the complexities of Unix may hamper its success on the desktop market, warned Andrew Toller, an analyst at consulting firm The DMR Group.

"People are still kind of frightened of it on the desktop level," he said. "I guess it's a disappointment but not a surprise that Unix hasn't penetrated the

desktop even on the high-end."

However, recently that has started to change, as last year, Novell made most of its agreements with Unix companies, he said. Destiny will be seen as a viable alternative to Microsoft's upcoming NT product and IBM's OS/2, he believes. According to Toller, the desktop market may be the biggest and most important market for the low-end Unix.

Martin Cheek
Edittech International



Networking in a box from Zenith

The new Zenith Data Systems (ZDS) range of 'user ready' notebook computers provides, among other powerful features, Ethernet onboard, making them what ZDS sales director Graham Jones calls "networking in a box."

The new one colour and three mono models incorporate an Intel chip which is compatible with the Ethernet networking standard. This chip sends and receives data through a ZDS-designed high-speed communications port. The capability opens up for users much faster access to LAN connections and data transfer than has previously been possible on portable PCs.

The colour notebook, the 325Lc, features an active matrix screen which is designed to offer wider viewing angles, better colour and faster response times.

The new models are the first in the ZDS range to include Nickel Metal Hydride battery technology. The company claims it has stood back until the technology reached the stage where it could offer a real price/performance advantage, and claims that each battery will offer between four and hours of uninterrupted use.

The mandate of 'user readiness' has also led the company to supply its new models complete with MS-DOS 5.0, Windows 3.1 and a Logitech Trackman mouse.

One of the most innovative characteristics of the range, however, is the READYDESK port replicator. This pint-sized alternative to the conventional docking station weighs, and costs, far less than its competitors. The recommended retail price of the READYDESK is \$199, and it provides simple click-in-and-use access to all peripherals as well as the standard functions of a full-sized desktop.

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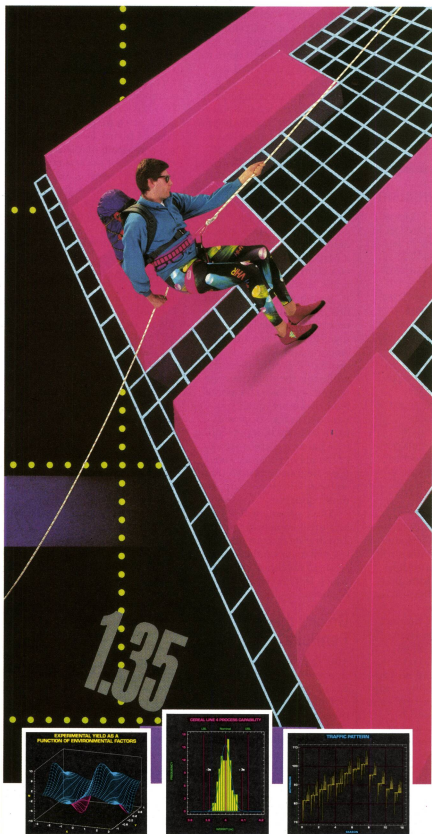


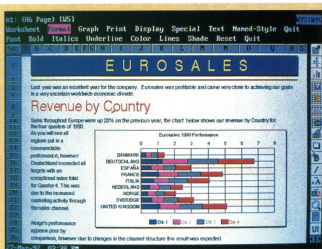
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Lotus announces new spreadsheet direction

At the launch of two new spreadsheet upgrades, Lotus 1-2-3 Release 2.4 for DOS and 1-2-3 for Unix System V Release 1.1, Lotus Development outlined its future directions in spreadsheet technology. In the next quarter, we can expect to see new versions of 1-2-3 for DOS, Windows, OS/2 and Unix, and by the fourth quarter, a new Macintosh release.

Commenting on the range of new products expected this year, Lotus' international product marketing manager Henry Kleive said: "Lotus' spreadsheet strategy has always been aggressively multiplatformed. This reinforces the company's 'Working Together' strategy by delivering leading spreadsheet technology for all major computing platforms, ensuring their compatibility with one another."

Among many other features, Release 2.4 for DOS offers a library of 73 SmartIcons for shortcuts to the commands most often used; the ability to customise your own SmartIcons; BackSolver technology; and the ability to print multiple page reports in landscape mode with WYSIWYG formatting.

Lotus 1-2-3 for Unix, Version 1.1 improves data access, operating-system compatibility, peripheral support and usability on low-end terminals. It also adds a development environment for building complete applications.

Boulos announces ambitious aim

Zenith Data Systems has announced a new avenue of distribution, in the form of a new company established by industry phoenix Mike Boulos. Boulos remains director of ComputerWorld Solutions (CWS), but says that the new company, Trio International, will operate at a different level in the channel.

Boulos likens the relationship between his two companies to that which currently exists between Ferritec and Sourceware, and asserts that the separate organisations will continue to perform their functions in co-operation, and not to the

exclusion of others. While, as Boulos says, "it's the same money", the companies will have no other relationship than those which form part of the normal dealings of distributor and dealer.

Trio will supply product to CWS and seek to form relationships with other dealers, although to date no-one has been signed up (signatures are apparently in the pipeline). The company's ambitious aim is to have in place a dealer structure of 200 outlets by the end of 1992.

David Sinclair, general manager of the newly formed Trio International, detailed the company's five-year market-dominance

strategy, differentiating the company's philosophy from other players in the distribution structure by the intention to 'Sell To Rather Than Sell Through'. Trio International, while supplying to the dealer channel, will aim its marketing expertise straight at the end user, and hope to gain rapid growth and a broad market profile. It claims that marketing has the ability to broaden the potential market, and while hoping to claim market share from others, the company also believes its effort will expand the market as a whole.

Trio International also has a mandate to succeed by providing products at a cost-competitive, support and delivery-oriented level which it perceived to be an important component which is currently lacking in the industry.

Zenith was chosen as the first product range to be represented because Trio regarded the company as a 'major manufacturer of quality PC products', and while it is the first, the company has plans to take on at least two more 'quality vendors' in the short term. It has a strategy of representing fast hardware and a variety of the major software vendors; negotiations with these software developers are currently underway.

The company will represent the complete range of Zenith Data Systems products, but will focus on the Z-Note series of notebook computers which were concurrently announced.

Go lifts the lid on PenPoint

After three years of closed-doors development, Go Corp. has unveiled its finished version of PenPoint, a pen computer operating system.

Backed by some of the industry's biggest names, including IBM, NCR and Oracle, Go will be travelling a difficult road as it attempts to challenge Microsoft's Windows for Pen and sway users to adopt a new operating system incom-

patible with any software that precedes it. While Go has taken on an uphill battle against the giant Microsoft, many small start-up software developers have created programs designed exclusively for PenPoint.

PenMagic's Go only product is Numero, a financial word processor that can mix handwritten notes and numbers with figures that PenPoint recognises. Two other software products created by Ink Development are a program that lets users take notes or draw sketches while in a meeting, and one that manipulates digital photographs on a pen computer screen and makes notes on them.

Edittech International

IBM goes pen

IBM has launched itself into the fledgling pen-based computer market with its release of ThinkPad.

The new computer, which runs on Go's newly finished PenPoint operating system, will begin shipping in limited quantities in July and is expected to cost US\$4500.

The pen-based computer has limited handwriting recognition and can manipulate images and drawings while the user is moving around.

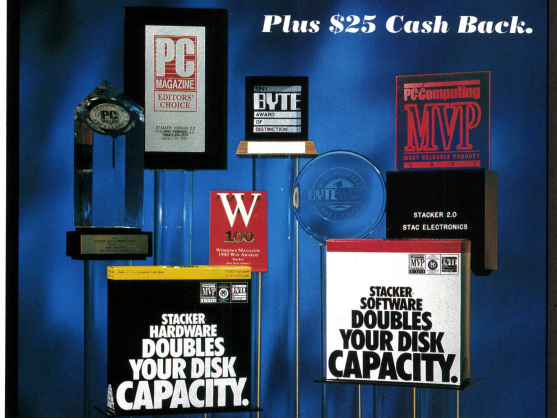
ThinkPad comes with a 386SX microprocessor, four million characters of internal memory, and a modem that can send and receive data or faxes. Weighing 2.7kg and the size of a spiral notebook, ThinkPad is bigger and heavier than competing machines from Grid Systems and NCR. ThinkPad is only the beginning of IBM's entry into the pen-based computer market, according to industry sources.

One analyst said Big Blue is working on another pen-based computer that will be 12.7cm wide and 17.8cm long. However, the product won't be finished until October, and analysts say that it won't really be done until the beginning of 1993.

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Acer 
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It's not a virus, it's artificial life

The lines between computer science and biology are beginning to blur with a new technology called artificial life. Using genetic algorithms, developers are writing programs in which creatures evolve and develop their own intelligence.

Although artificial life was first developed on massive supercomputers, Maxis, of SimCity fame, plans to release two artificial-life programs for PCs by the end of the year. The first, SimLife, uses artificial life to create an ecosystem where the disparate flora and fauna thrive or die, based on the player's decisions. The second program, called ElFish, lets you create forms of sea life.

SimLife uses artificial-life algorithms to alter the genetic makeup of the life forms. Using what Maxis calls 'computational ecology', both plants and animals change and evolve depending on environmental, chemical and genetic factors.

ElFish, short for electronic fish, is an artificial-life program being developed by a team of programmers who emigrated from Russia. The team, led by Vladimir Pokhliko and Alexei Pajitnov (the inventor of Tetris), is comprised of biologists and programmers who had been working with genetic algorithms in Moscow since 1989.

Although they first experimented with flowers and butterflies, the scientists settled on fish because of their beauty. ElFish lets you build computer-generated fish and a fish tank for them to swim in. After you've selected the parents, the computer generates the offspring based on the parents' gene pool. You can then mate those fish to create realistic-looking fish that only exist on your monitor.

During the 'gestation period', ElFish generates bitmaps by combining graphics and the parents' genetics. Using models based on the scientists' genetic and biologi-

cal research, the new fish inherit certain characteristics from their parents, but they develop their own unique identities. Since the fish are patterned after live fish, their swimming movements are surprisingly lifelike.

Christopher Barr

Microsoft Windows for Workgroups in beta testing

Microsoft has sent its beta testers a new networking version of Windows 3.1 in an effort to erase the line between operating systems and applications.

Windows for Workgroups, formerly code-named Sparta, will let users share files and printers without buying a full-scale network, according to sources. It also includes network Dynamic Data Exchange (DDE), a clipboard that can be accessed across the network, the ability to share Object Linking and Embedding (OLE) objects on the network, and a 'chat' application that lets users type messages to co-workers in real-time, sources added.

Planned to be available by the end of the year, the Workgroup version of Windows 3.1 will be sold separately from the standalone version of Windows 3.1. The networking product will also require a network adaptor card with an NDIS driver and cabling between all PCs. However, sources said that the system does not require a network operating system or file server.

Microsoft has drawn a lot of heat from its industry competitors because the networking version of Windows 3.1 will include Microsoft Mail 3.0 in the operating system.

One analyst commented that it seems like Microsoft's attempt to "cram its Mail API (application programming interface) down peoples' throats," and then said that many vendors have responded by offering users the options of VIM (vendor independent mail).

Mike Moeller
Edittech International

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GLOBAL #Sales: Total Cost											
Product Actuals - 1989						Variance Report					
East Actual						Variance Report by Product Eastern Region -- 1989					
LPs	CDs	Tapes	Total			LPs	Actual	Plan	Variance		
Units	19,499	34,678	23,597	77,774		Units	19,499	21,344	(1,845)		
Price	\$0.75	\$1.40	\$1.05	\$1.08		Price	\$0.75	\$0.75	\$0.00		
Sales	\$14,624	\$48,549	\$24,777	\$87,950		Sales	\$14,624	\$16,008	(\$1,384)		
COGS	\$13,671	\$24,314	\$16,544	\$54,529		Cost of Goods Sold	\$13,671	\$13,858	\$813		
SG&A	\$1,462	\$4,855	\$2,478	\$8,795		Selling & Admin.	\$1,462	\$1,921	(\$459)		
Total Cost	\$15,134	\$29,168	\$19,022	\$63,324		Total Cost	\$15,134	\$14,579	\$555		
Profits	(\$509)	\$19,381	\$5,755	\$24,627		Profits	(\$509)	\$1,029	(\$1,539)		
Eastern Forecast - Pdt A											
LPs	CDs	Tapes	Total			CDs	Actual	Plan	Variance		
% Sales	1989	1990	1991	1992		Units	\$4,578	30,200	4,478		
Sales	100.00%	100.00%	100.00%	100.00%		Price	\$1.40	\$1.40	\$0.00		
COGS	81.57%	79.63%	77.77%			Sales	\$48,549	\$42,200	\$6,349		
SG&A	12.00%	12.00%	12.00%			Cost of Goods Sold	\$24,314	\$18,476	\$5,838		
Total Cost	93.57%	91.63%	89.77%			Selling & Admin.	\$4,855	\$5,874	(\$1,019)		
Profits	6.43%	8.37%	10.23%			Total Cost	\$29,168	\$23,549	\$5,619		
Tax	2.70%	3.52%	4.30%			Profits	\$19,381	\$18,731	\$650		
Net Income	3.73%	4.86%	5.93%								
						Tapes	Actual	Plan	Variance		
						Units	23,597	26,100	(2,503)		

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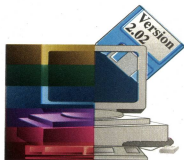
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2/06/1

APC's rundown of the latest product upgrades.



TEXT RETRIEVAL

ISYS 3.0 creates new standards in text retrieval

Local software development house Odyssey Development has announced the release of Version 3.0 of its text-retrieval product, ISYS. Since its launch in 1988, the product has become one of the hottest text-retrieval systems on the market.

The main enhancements in this latest version include an increase in indexing speed and speed of searches, as well as a reduction in the size of the indexes and memory usage in TSR mode.

You can now attach image files to text files, so once users have retrieved a text file, they can view the associated image. The new Query By Concept feature allows a

database manager to create a tree-like structure for users to follow, eliminating the need for users to be aware of what information is actually contained within a database.

Other enhancements include the ability to index spreadsheets, range search on numbers, attach notes to documents and index ZIP-compressed documents directly.

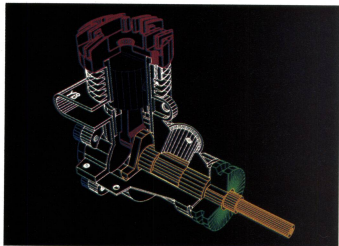
Distributor:
Odyssey Development,
(02) 965 7250

Price:
\$525; upgrade, \$165

COMPUTER-AIDED DESIGN

Production drafters' delight

Autodesk's latest version of the fully-integrated solid-modelling option for



AutoCAD Release 11 for the 286 provides sophisticated design capabilities at a reasonable price

AutoCAD users is claimed to offer improved accuracy, an enhanced programming interface, and stronger links between 2-D and 3-D design.

Called Advanced Modeling Extension (AME) Release 2, new features include a Region Modeler, which gives users working primarily in 2-D access to the same functionality 3-D users find in AME 1; double-precision accuracy for improved data integrity in downstream applications; Construction Plane, a new utility that allows users to create a primitive aligned to an existing solid without changing the User Coordinate System (UCS); and performance enhancements in Boolean operations.

Production drafters will find some interesting enhancements to SOLSELECT, which now converts sections into regions; SOLPROF, which includes multiple models

during a Hide operation; SOLCUT, which divides a solid into two parts; and SOLINTERF, which checks for zones of interference among solid model components. To facilitate developer self-learning, Autodesk has also integrated 11 sample programs, including source code and executables, into this release.

Distributor:
Autodesk, (03) 429 9888

Price:
AME Release 2, \$700;
upgrades, \$220

GRAPHICS

Multimedia authoring under DOS and Windows

Mathematica, maker of Tempra Pro and Tempra GIF, has just released Tempra



Although ISYS has developed into a sophisticated text-retrieval system, ease of use still prevails

Backing Up Australia



Leading Australian tape drive manufacturer Peridata has expanded its extensive range of tape drives, software, media and accessories.

Peridata have released a new range of internal and external Tape Backups with new supporting

software and accessories to suit most systems and networks.

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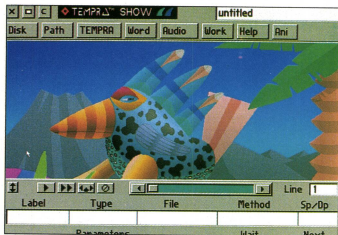
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APC002



Temptra Show's graphical user interface enables fast entry into multimedia presentations

Show for DOS and Windows. When combined with Pro and GIF, Temptra Show lets users scan images, capture video and slides, and import images for producing multimedia and videotape presentations.

The package's graphical user interface runs the presentation as it is being created and provides 26 screen wipes at 99 speeds. It supports more than 15 sound boards and lets users integrate voice, music and animation into presentations.

Temptra Show accepts video images processed by Temptra Pro and Temptra GIF, Autodesk's Animator, Animator Pro, and supports the likes of PCX and TGA.

Distributor:

Lako Vision, (03) 525 2788

Price:

Temptra Show, \$450; Temptra Pro, \$650; and Temptra GIF, \$150

Scrolling through clip-art made easy

We all know the frustrating feeling of spending hours scrolling through a clip-art library for 'that' piece of artwork. Well, Lotus Development has released a clip-art library for Windows that's a breeze to use.

Called SmartPics for Windows, it has a browser that lets users quickly scroll through a library of over 2000 pieces of artwork. Users can now view images quickly

onscreen before adding them to their Windows word processing, spreadsheets, E-mail or presentation applications via the Windows clipboard.

The program includes images for the likes of business, medical and sports needs, and offers an extensive range of arrows, page backgrounds, graphic elements and polygon typefaces.

Users can run SmartPics for Windows from Program Manager or via OLE, which both allow the program to become a menu option on leading word processing, spreadsheet, E-mail and business-presentation packages.

SmartPics comes with Lotus SmartIcons and macros for push-button access to images from within Lotus Windows applications, including Ami Pro and 1-2-3, and can be used as a standalone program or shared over the network.

Distributor:

Lotus Development,
(02) 287 1900

Price:

SmartPics for Windows, \$295

Enhanced visualisation tools

Autodesk has released an update of its 3D Studio program which is purported to provide new visualisation tools and productivity enhancements for graphics professionals using 386 and 486-based PCs.

Ideal for CAD users, video producers and other animation designers, Release 2 includes Video Post production module, which provides an entirely new environment for compositing multiple animations and backgrounds during the rendering process. (This special effect normally requires dedicated hardware.)

It also carries a CD-ROM containing over 500M of 3-D objects, textures and animations; some of the textures supplied on the World-Creating Toolkit disk include 62 varieties of marbles, 11 different cloud patterns and 59 types of wood.

Autodesk 3D Studio Release 2 runs on IBM, Compaq 386 and 486-based PCs or compatibles equipped with DOS 3.3 or later, 4M of RAM, a hard disk, a VGA device and a numeric coprocessor.

Distributor:

Autodesk, (03) 429 9888

Price:

Autodesk 3D Studio Release 2, \$3995; upgrades, \$2500 (an introductory price of \$495 applies for the first 60 days of release)

ELECTRONIC MAIL

Easy-to-use E-mail for PC LANs

WordPerfect Pacific's latest release, WordPerfect Office

3.1 for PC LANs is an 'easier-to-use' electronic mail program that, in conjunction with WordPerfect Connections (included in Office 3.1), provides cross-platform mail to users in the Macintosh, Unix, VMS and now, PC LAN environments, according to officials.

Office 3.1 now includes Folders — a way of organising incoming and outgoing mail — and a new Program Launching feature that allows users to compose, edit and read mail messages or graphic files in WordPerfect or ASCII format.

Other features include Remote Mail, which allows users to access all their LAN-based E-mail services while on the road, and an outbound fax service, which allows users to send messages directly through a fax machine connected to the network.

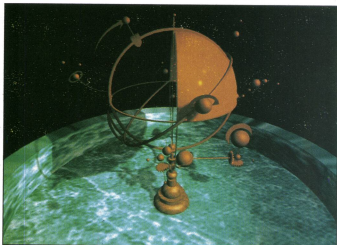
Office 3.1's licence allows users to include Connections Service — asynchronous and TCP/IP bridge software on any onsite PC dedicated to connections activities, including multi-LAN connections and asynchronous gateways.

Distributor:

WordPerfect Pacific,
(02) 415 5222

Price:

WordPerfect Office 3.1, \$290; PC LAN package, \$715 (five-user); additional licence-only packages, \$110 (one-user), \$1880 (20-user), \$8690 (100-user); upgrades, \$29



An orrery model rendered to a 640 by 480 resolution with 16.7 million colours

VIRUS SOFTWARE

Viruscan now sports save option

After skipping Version 87 and 88 (due to the Trojan horse versions which appeared on bulletin boards worldwide), McAfee Associates' latest Viruscan, Version 89 B, brings the total number of viruses that can be detected to 534, or counting variants, 1263.

Version 89 B now includes a 'save' option which allows it to be preconfigured so that it can default to scanning specific drives, checking or not checking memory, creating a specific report, or any other command-line setting for end users. It can also detect all viruses which have been encrypted by the new 'Dark Avenger Mutation Engine' (DAME).

Distributor:

Doctor Disk, (02) 281 2099

Price:

Viruscan Version 89 B, \$9.50 (single-user)

UTILITIES

Making the most of your computer's memory

The latest version of Memory Commander from V Communications moves wasted high RAM to conventional low DOS, and is now fully compatible with Windows 3.1.

Version 3.0 features an automatic perpetual optimisation of the high memory region between 640K and 1M which detects a new network driver, TSR or device driver each time they are loaded into the system. It will then offer to re-optimize the high memory region. If no TSRs or drivers are loaded, Memory Commander can increase conventional low DOS to 800K for running VGA graphics programs and 920K for running VGA text programs.

The program also has two additional capabilities for Expanded (EMS) and Extended (XMS) RAM. EMS and XMS RAM are pooled and allocated to each program on an as-needed basis; expanded memory sizes as large as 32M and extended memory sizes of 64M can now be serviced. It also supports 386SX, 386DX and 486 microprocessors; MS or PC DOS 3.3 and later; and Windows 3.0 and 3.1 (real, enhanced and standard mode).

Distributor:

Communications Strategies, (07) 801 2393

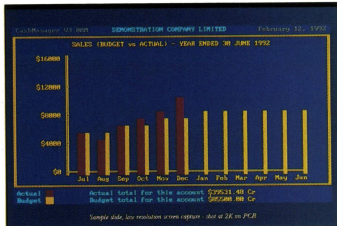
Price:

Memory Commander 3.0, \$148; upgrades, \$49.95

COMMUNICATIONS

High-speed modems at a reasonable price

With the demand for greater speed in the Australian



One of CashManager 3.0's many features includes the ability to display graphical representations of data

modem market, Interlink Electronics has released enhanced versions of its IQ12345, Base 12345 and Fastbit II modems. The enhanced versions — the top-of-the-range IQ6, Base 6 and Fastbit IIbis — incorporate V.32bis and are capable of full duplex raw data transfers of up to 14,400bps, as well as increased processing speeds.

To coincide with these releases, Interlink Electronics has also revised its price structure, with reductions of up to 10 per cent.

Distributor:

Interlink Electronics, (02) 362 4344

Price:

Interlink IQ6, \$1194; Interlink Base 6, \$799; and Interlink Fastbit IIbis, \$680

ACCOUNTING

An easier way to handle the money problems

An added bonus for the small-business owner — CashManager 3.0 from Accomplish Software, a cashbook program (rather than a full general-ledger program) that

doesn't require users to have any accounting knowledge. Users simply allocate cheques and deposits to income and expense accounts, and CashManager does the rest.

Version 3.0 features a budget-setting and reporting facility that allows users to set a budget at the beginning of the year, and then reports on the month's actual performance compared with the budget, as well as the year-to-date performance.

Other features include improved reports and graphs, an optional GST feature, the ability to integrate with many accountancy firms' own computer systems, and an improved Operating Manual format.

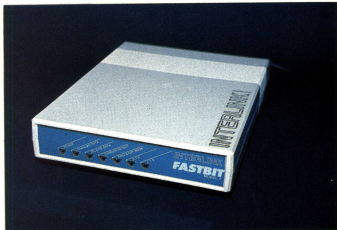
Of course, all the original features remain, including simplified data entry and reporting, automatic bank reconciliations, unlimited bank accounts and hotkey look up for searching or repetitive data entry.

Distributor:

Accomplish Software, (02) 904 1442

Price:

CashManager 3.0, \$475 (free of charge to existing subscribers). ☎



Coinciding with Interlink's launch of its new modems, the company has announced a new pricing structure

The material in this column is presented in good faith, but as it is collated from information supplied by distributors, APC cannot take responsibility for its accuracy. For inclusion, send your press releases and colour transparencies to Product Update, APC, PO Box 37, Sydney 2001.

"Our Bytepro 386 helps us remain highly competitive in a volatile industry"

Michael Bayly,
Industrial Chemist, KCB Pty Ltd, Brisbane

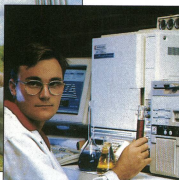


Queensland chemical firm, KCB Pty Ltd, relies on a BYTEPRO 386 computer to run and monitor its gas chromatograph; a sophisticated machine vital to the maintenance of peerless product standards.

"We use the chromatograph to constantly analyse product samples," says KCB Industrial Chemist, Michael Bayly. "If any sample is outside our narrow specification range, the shipment doesn't get through the door."

"Complete accuracy and reliability are essential and so far, the BYTEPRO's performed faultlessly."

"We have to be prepared for random Quality Assurance audits and inspections from regulatory bodies. But above all, the rigid standards this system allows us to maintain gives us a considerable edge in the market. Of course, the computer system has a vital role in this."



KCB also uses its BYTEPRO computers to monitor pumps to ensure correct quantities, aid new product development, run the accounting system and file 7 years' worth of records and test results. They're systems which, according to Michael Bayly, have made any concerns about product quality go up in smoke.

For applications that demand reliability, choose BYTEPRO. To inspect the complete range of new BYTEPRO 386, 486 & Notebook computers, find out the name of your nearest dealer by calling Byte Power today.

Dealer enquiries are welcome.



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386SX/20: 2MB
All expandable to 80MB * Expandable to 16MB



Bravo Series

Models: 386SX/20, 3/25s, 4/33
Hard Drives: SX/20: 40MB, 3/25s & 4/33: 80MB
Memory: 2MB expandable to 16MB

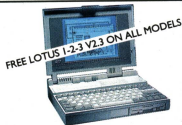


Premium Servers

Model: SE4/33
Hard Disks: 330MB, 660MB, 1GB
Memory: 8MB expandable to 80MB
Certification: Novell, SCO UNIX, Banyan, etc

New pricing across the entire AST range represents superlative value in the quality PC market. In addition, special offers valid until June 26, 1992 provide FREE Lotus 1-2-3 V2.3 software with the purchase of any of the models in the AST Notebook range - and a FREE upgrade on the Premium II 386SX/20 to 486SX/20 twelve months after the date of purchase. (This upgrade feature is available as an option on AST Premium II models 83V & 213V).

FREE NOTEBOOK - A FREE AST Premium Exec



FREE LOTUS 1-2-3 V2.3 ON ALL MODELS

Premium Exec Notebook Series

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386SX/20 Model 433V Notebook is yours with any purchase of AST PCs to the value of \$35,000 or more made before June 26, 1992. (*Conditions apply).

With any purchase to a value below \$35,000 made before the same date, comes an entry into a draw for one of three additional Premium Exec 386SX/20 Notebooks to be given away.

So for sensational value in AST PCs AND a free Notebook, call your nearest AST dealer today or AST on 008 80 0957

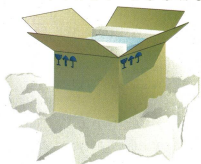
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HP replaces files and programs with objects and tools	Page 43



Quattro Pro 4.0: latest improvements add up to the ultimate DOS spreadsheet

With Quattro Pro Version 4.0, Borland International has delivered an emphatic message to its installed user base. Although intent on making a dramatic splash in the Windows spreadsheet market, the company has no plans to abandon its DOS users. The newest Quattro Pro (\$750) is the most extensive revision for Borland's character-based spreadsheet and provides welcome new analytic functionality, improved NetWare support, background printing and a host of other conveniences, including the annual enhancements to its presentation features.

The most visible change is probably also the least significant. In its WYSIWYG display mode, Quattro Pro now wears a mouse palette across the top of the screen, directly below the main menu. Like the SmartIcons of Lotus 1-2-3 for Windows (1-2-3/W), but unlike Microsoft Excel's toolbar, the Borland palette can be tailored to give single-click access to commonly used commands. Two 'speedbars' are provided: one for Ready mode and one for Edit mode. In non-WYSIWYG displays, these palettes run vertically at the right edge of the display, replacing Version 3.0's button bar.

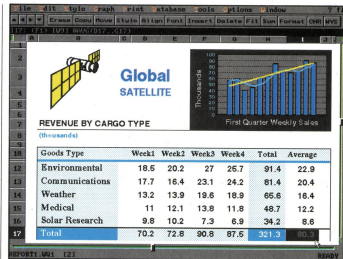
Because the program's

default speedbar includes a Sum button, Quattro Pro users — like Excel and 1-2-3/W users — can now create summation formulae for a whole block of columns or rows with a click of the mouse.

Quattro Pro is the only major spreadsheet package to offer bubble charts — x,y charts in which each point is surrounded by a circle scaled to reflect the point's position on an additional data series. Much more important, the program now has 'analytical graphing' commands. With these, you can take a series of daily sales figures and quickly convert it into a series of monthly sums or averages. The aggregation period can be any interval, standard or arbitrary, and any of Quattro Pro's statistical functions can be applied to the aggregated data. Unfortunately, there is no way to plot every nth point.

Other options let you automatically generate moving averages (weighted or unweighted) or plot the curve or line that best fits a scattergram. You can funnel the aggregated or transformed numbers into one of six graph series and plot them, either alone or alongside the original data. A Table command writes the transformed information onto the worksheet.

As if these were not enough



Quattro Pro's analytic graphing features make it easy to plot moving averages alongside untransformed data

good ideas, mouse users can perform graphing transformations with Zoom-and-Pan. This lets you magnify areas of interest (the axes are automatically rescaled, provided you haven't assigned manual scaling) and turn the result into a separately named graph that you can print by itself or display in a slide show.

Another major addition to Quattro Pro's analytic prowess is the Optimiser, an integrated version of Frontline Systems' What-If Solver add-in for 1-2-3. (A similar version is bundled as an add-in with Excel 3.0.) Using linear and non-linear programming techniques, the

Optimiser finds combinations of inputs that produce an optimal effect on a designated target cell while meeting specified constraints. The Optimiser replaces the linear-programming module that was supplied with Quattro Pro 3.0.

Programmers may now enhance built-in capabilities with user-defined functions. (A separately sold toolkit is required, and functions must be written in C or C++.) An add-in kit of financial functions was not ready in time for this review but should be available in the third quarter. The kit, developed for Borland by Tech Hackers, includes 49

Quattro Pro Version 4.0

Distributor: Borland
Telephone: (02) 953 9500
Price: \$750; upgrade from previous versions, \$85; competitive upgrade for Lotus 1-2-3 and Microsoft Excel users, \$160

Requires: 512K of RAM (640K recommended), DOS 2.0 or later (3.3 or later for LAN use) and 6M of hard disk space

In short: With Version 4.0, Quattro Pro gets new analytical power, support for network print queues, hooks for third-party customised functions, background printing, on-the-fly font scaling, and more.

functions for complex date arithmetic, cash-flow analysis, amortisation and yield calculations, and probability analysis.

Like 1-2-3 Release 2.3, Quattro Pro 4.0 now includes an optional print spooler. To use it, you load a TSR from the DOS command line before invoking the spreadsheet. The TSR uses about 18K of memory, it

spools print jobs to disk, and lets you monitor and manage its queue via a special window. NetWare users can also specify any network print queue as the default output device, and monitor and manage jobs spooled to that queue.

Important news for former Lotus 1-2-3 users and those who work in multivendor en-

vironments is Version 4.0's support (import only) for the .ALL, .FM3, .FMT and .WK3 file formats. Multipage .WK3 files read into Version 4.0 are broken down into separate Quattro Pro worksheets (up to 32 pages), and formulae that transect pages are reconstructed using Quattro Pro's linking syntax.

The translation of Allways, Impress and WYSIWYG files is not perfect. Formatting codes embedded in WYSIWYG labels turn to junk in Quattro Pro, WYSIWYG text fields are ignored, centred labels that spill left and right in Allways don't in Quattro Pro, and fonts and rules don't match as well as you might expect. Still, the support is good enough that you usually won't have to recreate complex formatting from scratch.

The upgrade also offers on-the-fly font scaling using Bitstream technology, thereby eliminating the font-building

delays that irritated users of earlier versions. Other publishing enhancements include support for named styles (you can use this feature to go beyond the eight-font limit of Version 3.0) and user-definable numeric formats. The latter let you display unit text beside numbers, force leading zeros, assign fill characters for cheque-writing purposes, identify dates by their weekday names, and more. Unfortunately, there's still no way to build a scaling factor into a customised numeric format.

Among other improvements are block insertions and deletions (allowing macro writers to adjust code without trashing worksheet logic), sorting by column and copying formats separately from values.

On the performance side, nothing appears to have changed.

Craig Stinson

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AutoCAD's successful Windows extension

Loyal AutoCAD users have waited a long time for Autodesk to bring the leading CAD program to Windows, but AutoCAD Release 11 Extension for Windows (AEW), the recently released Windows version of AutoCAD Release 11, was well worth the wait.

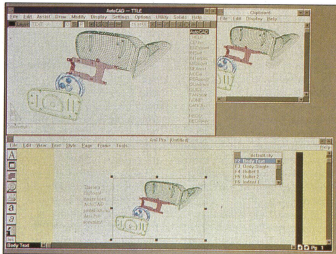
AEW, an add-on module to the DOS version of AutoCAD Release 11, is a smooth move towards the Windows environment, sacrificing only a fraction of the power of the DOS version in return for enhanced functionality in other areas and greater ease of use. With the exception of Advanced Modelling Extensions (AME) and network licences, neither of which is available in the Windows version, AEW does just about everything that Release 11 for DOS does. Further, AEW users have all the benefits of working in the Windows environment. Features that appear in AEW but not in the DOS version of Release 11 include DDE support, the ability to import and export graphics through the Windows Clipboard, online access to the AutoCAD reference manual, and a program-mable icon-based toolbar similar to those featured in other Windows applications.

The toolbar may be the single most important enhancement to AEW. Status panels in the toolbar show the cur-

rent colour, drawing layer and cursor co-ordinates. Three pre-programmed buttons allow you to quickly toggle orthogonal and snap modes on and off, as well as switch to paper space. (Here, AEW's designers didn't go far enough: it would have been helpful if the toolbar could be configured to show other parameters, such as the current object snap mode.) The remaining buttons may be programmed with the command or commands of the user's choice, permitting complex command sequences to be executed with a single mouse click.

AEW is full of surprises. The user interface is highly configurable, so if you don't like the traditional AutoCAD command menu that occupies the right-hand side of the screen or the command line that appears at the bottom, a simple configuration change removes them. Unlike many Windows applications which disable input while a time-consuming operation is underway, AEW keeps its message queue active during lengthy screen redraws. If you don't want to waste time while AEW redraws a complex screen, you can switch to another Windows program and return when redrawing is complete.

Surprisingly, AEW still only permits you to work on one drawing at a time. This will



Cutting and pasting graphics in a Windows environment is a snap, as is AutoCAD's ability to switch between applications

probably be remedied in Release 12 (due later this year), which is expected to support Windows' Multiple Document Interface.

In performance, AEW can't compare to the DOS-based AutoCAD. In our informal tests, AEW took an average of four times longer than did the DOS version of Release 11. If you plan to use AEW in industrial applications, you should invest in a fast processor and a video card that is optimised for Windows.

AEW's help system should serve as a model for other Windows applications. The basic help system features help on AutoCAD commands and system variables, drawing tools and procedures, and also includes a glossary of terms. For the cost of another 12M of hard disk space, you can install Enhanced Help, which gives you online access to a hypertext-based version of the AutoCAD reference manual.

Hardy souls who tapped the Autodesk Development System (ADS) to customise AutoCAD Release 11 won't be disappointed in the Windows version. AEW also supports ADS, enabling developers to write AutoCAD-callable

routines in Microsoft, QuickC for Windows and Borland's C++ 3.0.

Drawing files created with AEW are binary-compatible with files created with the DOS version. Windows users won't have to worry about maintaining separate sets of drawing files. Other file types, such as LSP and SLT files, may also be used interchangeably.

Prior to AEW's release, industry watchers wondered whether the name AutoCAD Release 11 Extension for Windows meant the product was a hasty port from the DOS version, designed to stall sales of other Windows CAD products until Autodesk could bring Release 12 to market. Don't be misled by the name: AEW is a full-blown Windows application.

AEW's low price of \$150, combined with the explosive popularity of Windows, should be enough to guarantee its success. Veteran AutoCAD users will love it because they can now run AutoCAD alongside other Windows applications. New users will also appreciate it, because AEW makes learning AutoCAD easier than before.

Jeff Prossie

AT A GLANCE

AutoCAD Release 11 Extension for Windows

Distributor: Autodesk
Telephone: (03) 429 9888
Price: \$150
Requires: 4M of RAM (6M recommended), 20M of hard disk space, Microsoft Windows 3.0 or later, numeric coprocessor, DOS version of AutoCAD Release 11 (\$4850)

In short: A windows-specific extension to AutoCAD Release 11 that brings the power and sophistication of the industry's flagship CAD program to Windows users.

Lotus Write 2.0: the low-cost Windows word processor with a full feature set

Lotus Write 2.0 is the first low-priced Windows word processor designed to make you want to use it. Lotus Development's \$295 package offers a surprisingly rich subset of features from Lotus' more expensive Ami Pro, and it only takes up half the disk space.

It doesn't allow you to create graphics, charts or tables, but if you use a word processor primarily to process words, it probably has all the features you will need to use.

Lotus Write looks and acts very similar to Ami Pro but

has slightly shorter menus. Both programs let you open nine files at one time, and both include Lotus' customisable SmartIcon palette, which can float anywhere onscreen, even outside the program window.

The programs also have built-in links to cc-Mail and Lotus Notes; both use the same spell-checker, thesaurus, and import and export filters; and both also share the same easily managed collapsible outlines and stylesheets complete with bulleted lists and boxed text.

They also both use the same advanced macro lan-

AT A GLANCE

Lotus Write Version 2.0

Distributor: Lotus Development
Telephone: (02) 287 1900
Price: \$295
Requires: 2M of RAM, 4.8M of hard disk space, Microsoft Windows 3.0 or later
In short: Lotus Write 2.0 a rich subset of features from Lotus' Ami Pro, including customisable smartIcon palette, ccMail and Lotus Notes, at a reasonable price.

guage — the most flexible language of its kind in any word processor.

You can import, resize and rotate graphics in Lotus Write,

but you can't create or edit them as you can in Ami Pro. You can't create tables in Lotus Write, but you can use Windows' Dynamic Data Ex-

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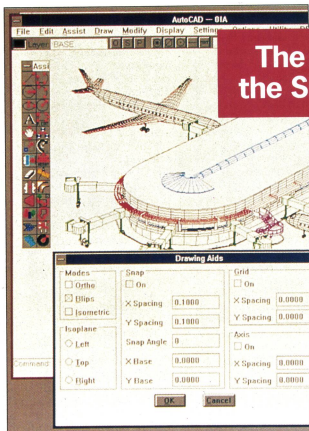
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AutoCAD Release 11 386 is required to run the AutoCAD Release 11 Extension for Windows.

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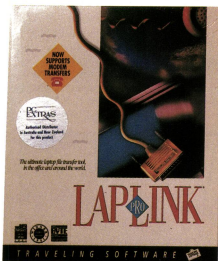
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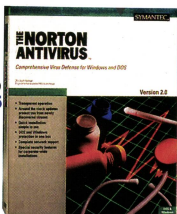


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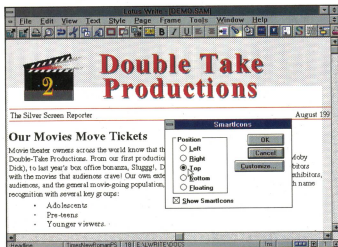


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Lotus Write, Ami Pro's smaller sibling, lets you customise the SmartIcon palette

change (DDE) to import data from a spreadsheet that changes when the spreadsheet

changes; or you can use Object Linking and Embedding (OLE) to import an Excel graph.

If you need advanced features such as master documents (which contain multiple files) or automated tables of contents, indexes and cross-references, then take Ami Pro, not Lotus Write.

You have to search to find other Ami Pro features that are missing from Lotus Write. One of them is Ami Pro's 'floating header', which starts on the same page with specified text and stays with it even if the text moves to another page.

If you don't use that kind of formatting, you'll probably never miss the features you don't get.

Lotus Write's performance closely matches Ami Pro's: slow to load; fast in almost everything else. You don't get

Ami Pro's background print format, but printing speed is on a par with full-featured programs. The program fills 5M, enough to make a significant dent in a laptop hard disk.

You can import Ami Pro files into Lotus Write — both programs use the same file extension — but a pop-up message warns you that any tables in the imported file will be lost.

Rival low-end Windows programs, such as Software Publishing's Professional Write Plus and Symantec's JustWrite, can't match Lotus Write.

If you want an inexpensive Windows word processor, then this is the one to choose.

Edward Mendelson

A3 Colour printing on your desktop with Canon's BJ800 bubble jet

The BJ800 is the latest colour bubble jet printer from Canon.

This machine can produce a copy print-out from all Windows-compatible software and a number of DOS applications, including WordPerfect and ACAD.

The printer is physically larger than most desktop inkjet/dot matrix printers, although, unlike others, the BJ800 can print on A3 paper.

It uses four separate ink cartridges (Black, Yellow, Cyan and Magenta) to produce excellent-quality full four-colour process printing. With a maximum resolution of 360 dots per inch (dpi), the output is suitable for most one-off colour printouts as well as colour proofs.

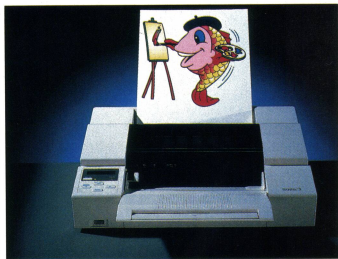
I tested the printer over a one-week period, printing a number of documents using Lotus Ami Pro 2.0, CorelDRAW 2.0, Microsoft Windows Paintbrush and Aldus Freehand 3.0.

As a text-output device, the printer performed similar to a low-end laser printer. By using Adobe Type Manager and Ami Pro, I was able to print a number of letters, which included a black-and-white logo and multiple typefaces. The result was a printout which would pass as a laser copy.

However, there were a few hitches encountered with the printer's colour performance, especially when I attempted to print an A3 full-colour poster. By using CorelDRAW to print an A3 poster with around 400 elements, it took approximately one hour to print the job. This was largely due to the time taken by the computer to calculate graduated and radial fills, as well as draw complex curves and then apply four-colour processing. While this was not a problem with the printer itself, it's very important to take processing time into account when purchasing any output device.

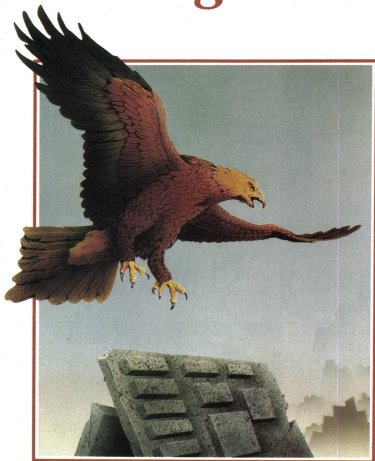
The final hard copy was worth the wait. The poster was beautifully coloured: areas which used graduated colours worked well, and very fine lines in greens and reds appeared to be printed in just those colours.

One point needs to be made about inkjet/bubble jet printers, however: when printing large blocks of colour, don't forget that they will be wet when they emerge from the printer. As the BJ800, like all inkjet printers I have used,



The BJ800 bubble jet colour printer uses four separate ink cartridges to produce excellent-quality four-colour process printing

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does not have an ink-drying mechanism, it's very important not to touch the printout until it has completely dried (up to five minutes).

In a test carried out that printed a colour (mainly red) logo on the top of a letter-head, it was possible to smudge the printout by printing a second page while the original was sitting in the output tray of the printer. As the second page moved across the surface of the first printout, it dragged over the printed logo and caused it to smudge.

At \$5499, the BJ800 is not for everyone. For those who are involved in the colour publishing business or the small-scale production of coloured material, the Canon BJ800 could be just what the doctor ordered — an inexpensive (when compared with colour laser printers), easy-to-use means of proofing your coloured text and artwork on paper. The printer could also be used in a corporate setting to produce colour charts and graphics in limited quantities.

Paul Paradigm

AT A GLANCE

Canon BJ800 Bubble Jet Colour Printer

Distributor:	Canon
Telephone:	(02) 805 2000
Price:	\$5499
Print speed:	170 - 340cps high-quality mode; 300 - 600cps high-speed mode
Print width:	28.5cm
Resolution:	360 by 360dpi
Capacity:	100 A4 sheets, 50 A3 sheets, 5 envelope sheets
Typefaces:	Roman, Sans Serif, Courier
Dimensions:	16.9 by 52 by 40.7cm (HWD)
Weight:	10kg

Arago gives Xbase developers hot compiler

Only rarely do Xbase developers sit up and take notice of a new product. Last year, it was Fox Software's FoxPro 2.0. This year, so far, it's the arrival of WordTech Systems' Arago Professional Version 2.0. Despite the version number, this is the first release.

Compatible with both dBASE III Plus and dBASE IV, Arago Professional includes both Arago Quicksilver, a native-code .EXE compiler, and an interactive CUA-compliant front end, dBOX, both of which can be purchased separately. The latter consists of several components, including INTRO, an end-user module for creating and manipulating databases; a PanelPainter that simplifies interface design via object-oriented technology; and a facility for generating business graphics from database files.

Arago also features enhanced memo fields, a number of useful development tools, and a C interface that rivals that of Nantucket's Clip-per.

If you're familiar with FoxPro's interface, you'll recognise the CUA-compliant aspects of Arago. While you can always use the dot prompt, Arago's INTRO offers pull-down menus, but-

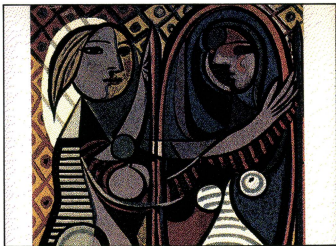
tons and list boxes for selecting actions, databases and fields.

The interface is, at times, anemic: the windows are not movable, sizeable or easy to see, and sometimes there's no way to use the mouse at all. It lacks a dot-prompt window like FoxPro's, and the interface is not as quick as competing products to respond. It's not that dBOX isn't easy to use — it is — but comparatively speaking, it's not nearly as easy as it could be.

Nevertheless, INTRO makes short work of mundane, everyday database operations such as open, browse, edit, append, delete and import/export. Some operations are even simpler to do than in FoxPro.

For example, all you have to do to relate two tables with dBOX is open the tables and select a relation field. In seconds you have a two-table browser/editor while maintaining a one-to-many relationship between the tables. No coding, just a few mouse clicks.

Even more impressive is the Arago PanelPainter. A panel is a dBOX object, an event-driven, CUA-compliant window that's composed of push buttons, list boxes and fields. Panels have built-in



PanelPainter allows you to select the objects you want, and Arago will generate the Xbase code for them

behaviours and attributes that can be used as is, or overridden if need be. You simply select and position the objects you want and Arago will generate the Xbase code for them. All the objects automatically reposition themselves when needed, and all offer built-in mouse support. Since the objects in PanelPainter are live, you can test them as you create them.

If you're new to this kind of interface design tool, the Quick Layout option lets you select the database fields to use and create a simple form that you either use as is or

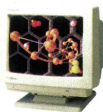
modify. Quick Layout automatically turns logical fields into check boxes, provides a look-up list box for state fields, and adds validation checks on telephone and postcode fields.

Once you've completed a panel, you can generate the Xbase code by selecting it from a menu item. There are options for controlling how the source code is generated and formatted, and how variables are declared. There's also considerable flexibility in what code is executed by what objects, and you can specify the scope of memory variables, keyboard shortcuts

If your PC could choose a monitor, it would want one of these.



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and prompts. Once you've finished, you can run the program as is or easily compile it to an .EXE file with Quicksilver.

While PanelPainter is incredibly powerful, it's often awkward and unintuitive. The mouse interface has gaps, and a toolbar would be better for selecting new objects. Resizing and moving an object can drive you crazy, and overall, PanelPainter is sluggish.

Arago's C interface is modelled after Clipper's: you can call C or assembler routines from your Xbase code, or you can have them call back into Arago via an API. You have a choice between the Microsoft or Borland C compilers (with FoxPro, you must use the Watcom compilers), and you can even call C functions from the interactive environment.

The Quicksilver compiler

is fairly easy to use and, considering the size of most Xbase compiled code (FoxPro programs are at least 640K and can easily run over 1M), relatively small. A simple program we created was 272K, and a standalone version of the two-table browser we built compiled and linked to 613K.

Other features for developers include Pocket-Soft's OptLink, up to 32-character identifiers, an application generator, a coverage analysis-based source profiler and Concentric Data's R&R Relational Report Writer.

Arago lets you create six different types of graphs from a database and graph forms (templates that change as the database does). You can send them to the screen or printer, save them as .PCX files or store them in an Arago memo field. Arago memo fields can contain any kind of binary

AT A GLANCE

Arago Professional Version 2.0

- Distributor:** Micro Data Management Systems
Telephone: (02) 746 2080
Price: Arago Professional Version 2.0 \$1699; Arago Quicksilver compiler, \$1199; Arago dBaseXL, \$999; 640K of RAM (2M recommended), 10M of hard disk space, DOS 3.1 or later
Requires: Arago is a professional Xbase development system with a powerful screen painter and a sophisticated C-language interface. It includes R&R Report Writer, graphics facilities and a simpler profiler.
In short:

data, and you can use a memo field in place of a character string.

Arago isn't as fast as FoxPro on all counts, but it comes close. Both dBaseXL .PRGs and Quicksilver .EXEs take about 50 per cent longer to build an index data file, 15 per cent longer to perform an unconditional search-and-replace and 70 per cent longer to execute a condition-

al search-and-replace. Considering that these differences are a matter of seconds on a 50,000-record file, you won't be unhappy with Arago's performance.

For developers, the combination of object-oriented technology, a powerful interface designer and a true .EXE compiler make Arago an unbeatable combination.

Richard Hale Shaw

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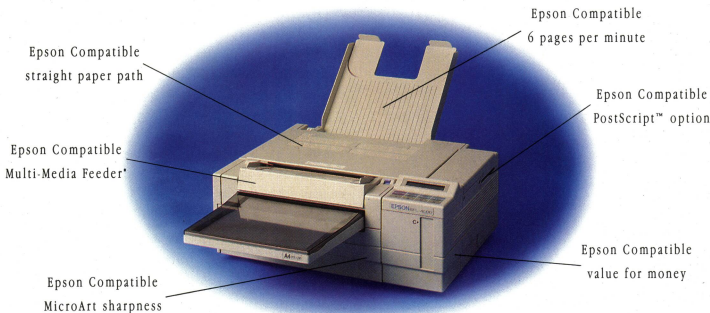
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NewWave 4.0: HP's Windows desktop manager moves mainstream

If imitation is the sincerest form of flattery, then the designers of Hewlett-Packard's NewWave must feel proud. Many key features in earlier versions of this Windows-extending environment now appear in Windows itself.

NewWave's compound-document ability predates Windows' Object Linking and Embedding (OLE); drag-and-drop is now mainstream; and the system-wide macro language announced by Microsoft was foretold by NewWave's Agent.

While a technical success, previous versions of NewWave have not been as well received by the marketplace as competitor Norton Desktop for Windows.

For example, NewWave's large disk space and RAM requirements shut out many potential users, and it ran only special NewWave-aware programs or required users to build laborious links to applications.

With its \$296 NewWave 4.0, Hewlett-Packard is attempting to overcome these barriers with a product that is easier to use, has less-taxing hardware requirements (only about 6M of disk space) and offers better linking to non-NewWave-aware programs. In many ways, it succeeds,

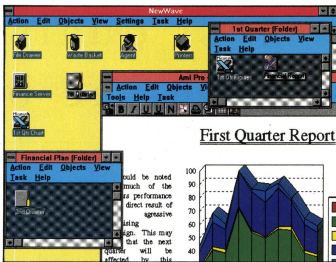
but the program still requires a profound change in the way you interact with your computer.

NewWave attempts to bring object-oriented programming to the end-user level. When you install Microsoft Word for Windows as a NewWave program, you do not wind up with a WinWord icon on the NewWave desktop. Rather, a WinWord Object Master — a template for making new objects — is created, and any files you create appear as Objects on the desktop.

For example, to make a new WinWord document, you choose Create Object from the NewWave menu, then choose WinWord Object from the list of Masters that pops up, and finally hit Enter to launch WinWord. The WinWord letter or memo you then create and save will appear on the NewWave desktop.

Another object type is a Folder, which can contain Objects or Subfolders that can be easily moved or copied. Since file maintenance is accomplished by moving or copying objects between folders, traditional file management becomes a non-issue.

This is an attractive model for computing and a possible



The centre of NewWave is a large window with Objects that you can easily launch, move and copy. Traditional file management is a non-issue

foretaste of the object-oriented file systems of the future. But your PC still has to live in the present, so NewWave includes a new command that lets you copy the file behind an object to a floppy disk for use on a non-NewWave system, and you still need Windows' Program Manager or File Manager to install new software from a floppy disk.

In addition to the basic desktop for creating and manipulating objects, NewWave includes some impressive automation tools.

The core of these is the Agent, a combined batch language and macro program. You can record simple tasks and then edit them to add branching, dialogue boxes and event processing. The language is powerful but opaque.

NewWave offers a scheduler, so you can run tasks at a given time or on a regular basis.

If you're running NewWave on a network, you can

arrange to be notified if a file changes. A control panel to set colours, the ability to minimise objects and a workgroup library to transfer files across a network are also new.

While this version has eliminated some of NewWave's almost religious adherence to object concepts at the user's expense, there are still some instances where purity gets in the way of practicality.

For example, there is no way to use a program's multiple document interface (MDI) capabilities without coping with the underlying opaque file and directory names that NewWave assigns. And you can't schedule a task directly from the Agent Scheduler.

NewWave remains a program with a steep conceptualisation curve to overcome. If its philosophy appeals to you, then you will find the environment well implemented and flexible.

Barry Simon

AT A GLANCE

NewWave Version 4.0

Distributor: Hewlett-Packard

Telephone: (03) 895 2895

Price: \$296

Requires: 2.5M of RAM (4M recommended), 6.8M of hard disk space, Windows 3.0 or later

In short: NewWave takes object-oriented Windows to its logical extreme by replacing files and programs with objects and tools. Its automation tools are especially complete.

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The ailing ethics of software piracy	Page 45
Creosote's Law of (un)available hard disk space	Page 46
The future of the distribution channel	Page 49
The software piracy bluff	Page 50

The recent coverage of the Prices Surveillance Authority's (PSA) enquiry into the cost (real or retail?) of business software has brought to prominence the function of the Business Software Association of Australia (BSAA).

The BSAA was established in 1989 to protect and defend the rights of developers to the intellectual property applicable to their works; educate and deploy resources against widespread software theft or piracy; and make companies and individuals more aware of their legal and often disregarded ethical responsibilities. The BSAA acts as an information agency, promoting good IT audit practices and acting as a non-partisan forum for taking calls on alleged piracy and software abuse.

While membership fees of an initial \$120,000 and \$60,000 per annum thereafter assure the association's membership will be limited to a very select 'in-crowd', an associate membership fee of \$1000 allows smaller companies to access the valuable information and hotline services offered by the association.

BSAA chairman Jim Macnamara believes the association also benefits non-members by virtue of the widespread education campaign it has initiated and sustained.

While the BSAA provides legal representation where appropriate for members, according to Macnamara, non-members whose software is reported on the hotline as a target for theft or illegal use

are also informed of this report as a good-will gesture and an indication of how seriously the BSAA regards the issue — it's not simply the rights of its members.

Prevention is the best medicine, and sterner, tighter business practices hold the answer, according to Graeme Stevens, consulting principal with the DMR Group. Inadvertent contravention comes from a lack of control over the use and distribution of software in large companies with widespread PC installation.

Typically, such transgressions are predominantly caused through negligence rather than intent, and can be more efficiently avoided with a simple routine audit procedure noting how many licences have been paid for on any given application, as well as on which terminals those licences currently reside. Stevens also points to the importance of a more widespread understanding of what the company and individual's contractual responsibilities are.

In the end, it probably comes down to relying on education to change attitudes across the broad spectrum of users. However, it was distressing to read several weeks ago an article entitled 'Is copying computer software unethical? Not necessarily...', which was written by a lecturer in accounting at Deakin University.

The article, which I initially thought was the product of a friend's elaborate April Fool's sense of humour, details the supposed defensibility of software theft based on jus-

tifications such as cost and the already widespread occurrence of piracy.

My mother talked me out of the 'everybody's doing it' justification with the old 'would you put your head in the oven' argument when I was about six. Apparently it has survived in some quarters!

While it is futile to try to reproduce Smith's argument here for lack of space and the certainty of conscience-ridden reprisal and charges of being quoted out of context, the body of the argument suggests that if software is too expensive for small-business users who nevertheless feel they need the processing power it has to offer, they should seek sanctuary in their need and feel justified in their illegal acquisition of business tools.

This argument ignores the obvious fact that the costs to the software-development industry of bringing such business tools to market are substantial and repaid only in sales of the product.

It also ignores the value of the many intelligent and dedicated people who answer software help lines across the country. How else are these people paid by the company if not with the money derived from selling software? The so-called huge profits on the price of the disk and the licence to use (not own) the technology are put not only to further development but to fulfill the company's commitment to supporting current users with their myriad applications.

To bring the argument back into the tangible world,



Creeping out from the doors of academia is an 'Is software piracy unethical? Not necessarily...' attitude.

HELEN DANCER

stealing word processing software is not terribly different from stealing a typewriter, or knocking off a pirate copy of a spreadsheet is not far removed from stealing a calculator. Theft is theft, and Smith's approach of 'to each according to his need' ignores the other half of the Marxian equation 'and from each according to his ability'.

Software piracy puts nothing

back into the industry, helps no-one and has the potential to harm the very users who willfully or innocently copy programs. Illegally acquired software is more susceptible to viruses and 'undocumented features' commonly known as bugs, merely by virtue of the fact that it has 'been around', has no guarantee of having been purpose-designed for the sys-

tem on which it's being illegally installed and has no upgrade path. No system is static, and no user is ever going to continue to increase their productivity unless the technology they employ can keep pace.

All this is stating the obvious. I find more distressing the fact that these opinions are coming from the halls of academia, a place we trust to

value and respect the notion of intellectual property.

If we cannot expect to be defended, supported and protected in our search for an exploitation of great ideas, at least notionally, by those who tend and nurture the tree of knowledge, we can expect even less that the marketplace will acknowledge and value the continuing costs of such a contribution.



*When your hard disk
platter runneth over, it's
either time for an
upgrade, or time to
indulge in a little
judicious file pruning.*

IAN ROBINSON

What to delete next? For any PC user purchasing software on a regular basis, this question represents an eternal dilemma.

Creosote's Law — as relevant today as it was a decade ago — states that software expands to fill all available disk space. Creosote, of course, was the rather portly chap in Monty Python's 'The Meaning of Life' who filled himself to capacity and beyond with explosive consequences.

In other words, no matter how much hard disk space you have, it's always just about chockers. The frightening aspect of all this is that it generally applies to network servers as well as individual hard disks. And, as any halfway-technical propellerhead could explain, a nearly full hard disk is a lot slower than a nearly empty one.

In the feature-driven applications software war, new versions of popular packages demand ever-increasing numbers of megabytes, leaving the notion of spare capacity for data just a nostalgic memory. The output of prolific users, whether they be code cutters, word processor pounders or spreadsheet jockeys, also contributes significantly to local data bloat.

In addition to today's mega-applications, there are the multitudes of fonts, style sheets, templates, clip-art graphics, sample macros, dictionaries, thesauri, help files and tutorials that come with them. Any new package nowadays with less than a dozen disks is regarded as stripped-down or somehow lacking in functionality.

So, how do you and your existing hard disk tenants make room for these overcrowded new neighbours? For a start, you can make them dispense with some of that superfluous baggage. Get rid of the Olde English font, the sample US tax form generator, the zipcode listing, the Swahili dictionary and all the other irrelevant junk that often gets loaded in by default at install time. Be ruthless — you can always re-install if you take things a little too far.

Second, have a look through the subdirectories of your existing applications — it's amazing how many useless disk-hogging files can be hidden in there. Obviously, you can't afford to be quite as manic in your deletions with items that your livelihood may depend upon. If in doubt, leave it there, because you still have a few more handy disk-slimming tips to try out.

File compression programs are a godsend, especially when it comes to shuffling things around to get a bit more space. Public-domain legends such as ARC and PKZIP have been circulating the PC underground for years, scrunching and unscrunching files throughout the world. These utilities, along with their commercial counterparts, can reduce file sizes by 40 to 60 per cent, and sometimes beyond. Clip-art collections and vast assortments of text files are prime targets for such binary byte-crushers.

Often, the overall layout of your hard disk directory structure can be overhauled to yield extra megabytes. Removing duplicate files or groups of files

can help create more space, as can eliminating drivers for hardware you no longer use.

It's often a tough decision, but there may well be entire applications you simply don't use any more, and therefore should remove. For example, there's that project manager you thought you might use one day, or the grammar checker that you totally ignore.

Unless you've 'borrowed' your copy, you can always re-install it if required, using the original disks. Similarly, that adventure game you solved (or gave up on) some time ago may as well get the flick too.

However, like everything, there's a limit as to how far you can go. There's nothing more annoying than suddenly needing to use an application or file you dispensed with just a few days ago. In a networked environment, one often hears the howls of derision that inevitably follow the system administrator's periodic purge.

Ultimately, if you end up spending more time making room for new software than you do using it, then it's time to invest in a new hard disk. With the price per megabyte currently lower than at any other time in history, you need only flick through the pages of APC to spot some mouth-watering hard disk bargains.

And, with a bit of luck, you may even be able to keep the original disk installed, easing the transition to your new beefed-up system. But you can guarantee it will not remain beefed-up for long — Creosote's Law will take care of that.

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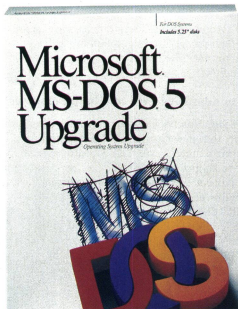
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Unleash the Power

People still copy software, and most of us who work for a living have little sympathy for the plight of the software vendor. After all, the software industry will eventually generate more millionaires than any other business in history. Bill Gates, with a net worth of \$US7 billion, is now the richest man in the US, and his money was accumulated from scratch — zero — in 15 years flat. Meanwhile, the watchdog Software Publishers Association (SPA) and Business Software Alliance (BSA) claim that whatever the software industry sells, it loses at least 50 per cent to pirates. In other words, Bill Gates should be worth twice as much!

Let's examine Gates' net worth. If you made \$US5 million a year (and few people do) and put it under your bed, it would take you 1400 years to achieve Gates' current net worth. Here's another cute calculation: forget about interest. If you lived to be 70, to achieve Bill Gates' current net worth, you'd have to make \$US100 million (that's got eight 0s in it!) each day from the day you were born until the day you died.

At Microsoft there are something like 100 millionaires (maybe more). It's easy to go on and on about

this. Suffice to say that the public is not too thrilled with overnight millionaires (or billionaires) who are whining that they aren't making enough money because pirates are ripping them off. To expect a sympathy vote from the public is ludicrous. When you consider the wealth of a Bill Gates, and how impossible it is to achieve such wealth, you have to wonder who's ripping off whom. While software serves a useful robotic function, does it have to cost so much? No way.

Meanwhile, in a never-ending attempt to coerce the world into paying more money for software that's practical, the BSA is now attacking Germany. According to a news report: 'In a submission to the US Trade Representative regarding allegedly inadequate copyright protection, the Business Software Alliance says Germany leads its list of countries causing the world software industry's greatest revenue loss from piracy... [With] 1990 losses of \$US1.86 billion, the BSA recommended Germany be placed on the Priority Watch List by the International Intellectual Property Alliance. (The IIPA represents the copyright industries of software, motion pictures, music and books.) The BSA predicts its next target will be Italy and Taiwan

where it estimates total piracy losses in 1990 to be \$US753 million, respectively'.

The question on my mind is: how were these enormous figures for piracy calculated? Out of thin air, that's how. You guess how many illegal copies might be made per unit sold and then multiply that number by the total legitimate sales in the country.

If copyright protection were perfect, would the extra monies be realised? Unlikely. The fact is that most users, instead of buying software that they earlier copied, would use inexpensive shareware or bargain replacements. In fact, the software industry would probably be sunk if piracy were eliminated. Prices would fall rapidly as market share was gained by the cheap alternatives until they dominated the software market altogether. These piracy loss figures are bogus, and the software industry knows it.

The message that needs to be sent to the software industry can only be sent by the users of bootleg software. Go legit and buy those inexpensive shareware and public-domain alternatives. The industry will stop whining about lost revenues from piracy when we refuse to play its game.



Why get excited over revenues lost to software piracy when the industry is making such a profit each year?

JOHN DVORAK

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*The times are changing
for the distribution
channel, especially as the
concept of direct
purchasing takes off in
Australia.*

JEREMY HOREY

A dramatic change is occurring in the way PCs are sold, as witnessed by the problems in the dealer channels. Over the next few years, customers will be faced with four different ways in which they can buy their PCs.

Some corporate buyers will probably follow the current way of buying PCs, where support and system integration services from their dealers is important. While this will prove to be the most expensive way to make a purchase — as these services will understandably have to be factored into the cost of PCs by the dealers — buyers will be willing to pay the premium to avoid carrying out services in-house.

Over the next year, mail order and alternative methods of selling PCs direct from the manufacturer will be accepted by the Australian market. Already, a substantial proportion of computer manufacturers are selling direct to their largest customers.

Purchasing PCs via mail order has been popular in the US for several years and, as the recession eases, local companies should consider setting up these operations.

The major advantage for customers in mail ordering and direct purchasing is that there are no dealer service costs. With the maturing market becoming increasingly price-sensitive, these methods are becoming more attractive.

Some customers will forego the dealer channel and purchasing direct, and build their own PCs in-house. Although

this may sound like an expensive alternative, there are two factors that make it viable.

First, components are now standard commodity items — they all fit together easily and are cheaper than ever before, especially when purchased in bulk. Indeed, a large company could pay the same price for its components as a PC manufacturer would.

Second, it can actually reduce support costs once the PC has been assembled. Since the support personnel have built the PC from the ground up, they know all about what's inside. Any problems can be solved by simply replacing a part, and parts will be cheaper since they are acquired as part of a bulk purchase for building the PCs.

The final purchasing path will see growth in the number of specialist assemblers such as Protech, which builds PCs to companies' specific requirements. If, for example, you needed 20 386 PCs with CD-ROM drives and 200M hard disks, you could order these

machines from an assembler, and they would be delivered preconfigured according to your requirements. The assembler may even install the basic software for you.

Some corporate customers may also choose the retail chains as sources of PC hardware, although I imagine prices wouldn't be as competitive as dealing direct with the PC manufacturer. The retail chains will be a more suitable source of product for small business and home users who can't buy in bulk.

While it is distressing to see so many dealers going out of business, in the end the customer will benefit. PCs will, on the whole, be cheaper and customers can choose the level of support they want to pay for.

The challenge for dealers is to either establish themselves as providers of good support and system integration services, or move out of the PC hardware business altogether into another profitable area of the industry.

OVER THE YEARS THE STAFF HAD BECOME QUITE PASSIVE AND WOULD RATHER DO NOTHING THAN SUGGEST NEW APPLICATIONS OR IMPROVEMENTS



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NEW! Diamond Stealth URAM 1MB UGA

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Peter Norton On Desktops.



For many years, I have worked to help people gain mastery over their PCs by developing a number of powerful DOS enhancements and utilities. But these products were targeted to the more technically advanced user.

Now I am proud to announce a new category of products for every DOS and Windows user that makes computing easier, faster, safer, and ultimately more productive: The Norton Desktops.

Beginning last summer, with the release of The Norton Desktop™ for Windows, we demonstrated the incredible demand for this kind of product. Now, we're ready to release The Norton Desktop™ for DOS, which brings the same benefits to the rest of PC users.

Simply, a better way to work.

How is this possible? The Norton Desktops provide a unified visual

approach—a desktop—that speeds and simplifies the way you work in DOS or Windows by granting easier access to the files, documents, and applications you use every day. While supplying a full array of non-technical tools that enhance the way you work and protect the results.

Corporate users will be interested to know that the Norton Desktops are consistent in design and function, reducing training and support costs, and providing an easy migration path from DOS to Windows.

***One revolutionary idea,
two innovative products.***

Let me introduce you to an improved Norton Desktop version 2.0 for Windows that maximizes Windows 3.1. And a revolutionary new Norton Desktop for DOS that finally brings drag-and-drop simplicity to users of DOS PCs. I am confident you will be impressed.



The Norton

Point, Click, Drag, Drop. Now *This* Is DOS.

Norton Desktop For DOS

File Disk View Configure Tools Window Help

See how visually inviting and easy to use DOS can be.

Welcome to The Norton Desktop for DOS, a revolutionary new approach that gives DOS PC users visual drag-and-drop file management, in combination with a fully integrated set of easy-to-use utilities.



Suddenly DOS takes flight.



Drag-and-drop ease of use comes to DOS. To move files from your hard disk to a floppy drive, just point and click.

Imagine sitting down to your DOS PC and finding an intuitive visual desktop where you can manage files and run programs with point and shoot simplicity.

Suddenly, you can move, delete, copy, print, view, backup, or scan

files for viruses, using the mouse to click, drag-and-drop. Or, use the keyboard.

And you can do all this with the security of Norton's acclaimed backup, virus protection, and data recovery utilities. You can even set up schedules to automate your backup and virus scans, so you'll never have to worry about losing data.

All, without using a single DOS command!

Plus, when you're in between work sessions, colorful, animated screen savers pop up over any application.

Simply click on a file and drag it to our unique feature bar to backup, print, or take other actions.



A new view of personal productivity.

The Norton Menu automatically creates a menu of your applications. View files from any of over 60 popular applications as they would normally appear—without taking time to load the application. Even without having the application.

And because each function works the same way, once you've learned one feature, you'll be comfortable with the rest.

Corporate users should also know it supports all major networks.

A Window on the future.

Because its companion, The Norton Desktop for

Windows, uses the same interface and commands, you'll have an easy migration path to Windows.

An investment with a guaranteed return.

The only way to truly appreciate The Norton Desktop for DOS is to see it yourself.

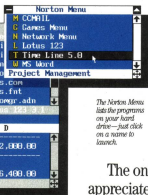
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You will never see DOS the same way again.



The Norton Menu lists the programs on your hard drive—just click on a name to launch.

Double-click on a drive icon to see all your files in a movable, resizable window. Below it is a virus pane showing a spreadsheet or any type of file you wish to preview.



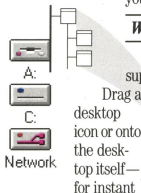
Desktops.

Make Fast Work Of Windows.



See what makes The Norton Desktop version 2.0 essential for Windows 3.1.

The Norton Desktop version 2.0 for Windows offers a new suite of features that fully optimizes Windows 3.1, making it easier to use, and helping you be more productive.

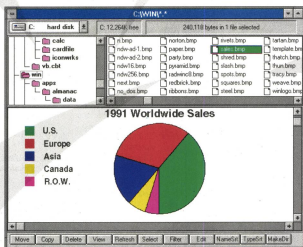


access. Copy, move, delete, or print files by clicking and dragging them to buttons and icons.

We've integrated the File Manager directly onto the

Watch Windows 3.1 sparkle.

Experience full drag-and-drop support across the entire desktop. Drag a file or drive icon to any



Double-click on a drive icon to see all your files in a movable, resizable window. Below it is a menu pane showing a spreadsheet or any type of file you wish to preview.



Frequently used applications and files can be placed on the desktop for convenience.

desktop, to simplify file and program management. To access files, just click on a drive icon. You'll get over 45 file viewers that allow you to examine a file quickly and easily without pausing to load its application.

And the customizable button bar puts often-used functions at your fingertips.



Keep your favorite Windows applications and files in a customizable icon tool bar.

It all happens quickly, too. Version 2.0 loads up to six times faster than version 1.0 for even better performance.



SmartErase

The best Windows tools you can buy.

The Norton Desktop for Windows comes with a full set of utilities, including fast automatic backup; precision data recovery (with SmartErase™);

You get all the utilities you need to backup, protect, and repair your data.



Printer#1



Backup



AntiVirus

comprehensive virus protection; and more.

Because it works the same way as Windows, you'll see instant results. And it's compatible with all DOS and Windows applications, and leading networks.

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"I never run Windows without it."
Walter S. Mossberg
Wall Street Journal, 4/2/92

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25 Reasons Why Every DOS or Windows User Needs a Norton Desktop.

The Norton Desktop for DOS.

Makes DOS Easier

1. Simple, intuitive drag-and-drop interface
2. Over 60 file viewers, so you can view file contents without launching the application
3. Powerful file management; allows you to find, view, backup, virus scan, copy and more
4. Automatic Scheduler launches programs at any time
5. Pop-up reminders for meetings, phone calls, appointments, etc.
6. Full keyboard support for users without a mouse

Organizes Your Applications

7. Norton Menu loads applications with a keystroke
8. Autobuild™ feature automatically creates a menu of applications

Dependable Virus Protection

9. Protects against over 1,000 viruses—with FREE updates for protection against new viruses
10. Automatically protects in the background—using only 1K of memory (loads high)

Fast, Automatic Backup

11. Scheduler automatically performs unassisted backups
12. Backs up to floppies, hard disks, network servers, or tape drives
13. Advanced data verification to ensure reliability
14. Restores data even from damaged backup disks

Automatic Data Protection and Recovery

15. Automatically repairs most disk problems
16. SmartCan™ provides 100% recovery of deleted files even on a network

Portable Computing

17. Fast serial and parallel file transfer between your portable and desktop PC
18. Compares laptop and PC directories to keep contents current

Network Ready

19. Easily transfers files between computers on a network
20. Network installation available, with full support for Novell, LAN Manager, Banyan, LANtastic, and all NetBIOS-compatible networks

And More

21. Colorful screen savers with password protection
22. Disk cache boosts performance
23. Speed Disk™ optimizes hard drive performance
24. Transparent drag-and-drop file compression/decompression in ZIP format
25. Optional Norton Commander™ mode

System Requirements

- DOS 3.1 or higher
- 512K RAM
- IBM AT, PS/2 or 100% compatibles
- Hard drive required

The Norton Desktop for Windows.

Makes Windows Easier To Learn and Use

- NEW** 1. Global drag-and-drop across the entire desktop
- NEW** 2. Superior file management with single, integrated file and program manager
- NEW** 3. Loads up to six times faster than version 1.0
- NEW** 4. Graphical, expandable tree directory views by date, file type, size, or alphabetic order
- NEW** 5. Over 45 file viewers (including 19 new ones) let you view files without launching applications; permits searches from viewer
- NEW** 6. Animated color screen savers with optional password protection
- NEW** 7. View groups as icon toolbar or menu
- NEW** 8. Desktop arrange keeps your desktop organized
- NEW** 9. Customizable fonts
- NEW** 10. Enhanced Windows text editor (Desktop editor)

Fast, Automatic Backup

11. Schedule background or unattended backups
12. Fast—up to 3.6 MB per minute
13. Back up to network servers, Bernoulli boxes, or disk drives

Automatic Data Protection and Recovery

14. SmartErase/UnErase for fast recovery of files
15. Restores re-formatted hard drives
16. Automatically diagnoses and repairs damaged disks

NEW Dependable Virus Protection

17. Protects against over 1,000 viruses—with FREE updates for protection against new viruses
18. Automatically protects in the background—using only 1K of memory (loads high)

System Tools and Enhancements

19. Launch Manager starts a new program from one that's running. Access applications directly from Windows Control Menu
20. SuperFind searches drives and network servers for files by name, extension, attributes, date, and text strings
- NEW** 21. Batch Builder™ and Macro Builder™ help you build your own menus and automate tasks
22. Icon Editor and Librarian lets you use and customize a library of over 150 icons
23. KeyFinder™ instantly identifies keystrokes required for special text characters and symbols

Network Features

- NEW** 24. Network installation available, with full support for Novell, LAN Manager, Banyan, LANtastic, and all NetBIOS-compatible networks
25. Includes network security features like restricted file launching from drive windows

System Requirements

- Windows 3.1 or higher
- 2 MB or more RAM (3 MB recommended)
- Windows 3.0 or higher
- 9 MB free disk space (for full installation)
- IBM AT, PS/2 or 100% compatibles
- EGA, VGA, XGA, or SVGA video card

To see how The Norton Desktop for DOS or Windows can truly change the way you work with PCs forever, see your nearest dealer today.

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Please allow three weeks for delivery.

SYMANTEC



There's been much hype recently about the imminent boom of direct purchasing in Australia. Geoff Isaac surveyed our Corporate Advisor panel about their purchasing intentions and found that PC sales through this distribution channel are expected to double in the next 12 months.

Direct purchasing set to strike in Australia

The next 12 months will see the most dramatic change in the way PCs and related products are sold in Australia since the micro-computer was invented. There can be little doubt that the second half of 1992 will see Australia follow the distribution-channel changes which have already occurred in the US and Europe.

Direct distribution involves hardware and software vendors and dealers soliciting orders in direct response to advertisements, usually in the print media. Direct response means placing an order by telephone (usually through a 008 number), fax, post or through an online information system for products appearing in an advertisement.

To date, the Australian direct market has been restricted to a relatively small number of dealers offering goods (usually software) through advertisements and brochures. However, the growing international trend and the imminent threat of experienced professional direct marketers arriving from overseas is forcing hardware vendors to join the party.

DEC recently announced its intention to embrace the trend and move staff away from the direct sales force, allowing them to concentrate on marketing and selling PCs

directly to the Australian public. IBM is expected to follow suit within the next couple of months. These developments have forced the distribution issue to the top of the agenda in the board rooms of all the major players in the local market.

Local vendors are being forced to face the challenge — at the risk of upsetting established dealer networks — and establishing the infrastructure to deal directly with the public. Any vendor not seriously facing these challenges can only be contemplating revising their sales figures in one direction, and it certainly isn't up!

The rewards for those vendors who quickly react to market changes will be great.

In addition to improved total sales, for early entrants, savings will be made as markups by middle men are effectively removed (of course, the costs of dealing directly with and supporting clients must be considered).

Vendors will also benefit from near-perfect market research. Sales can be monitored and sourced as they occur, and sales and production targets can be continuously revised. Contrast this with the current situation, where vendors rely on information on how many units have been shipped to distributors, followed by variable sales information which can be months out of date, and another attraction of direct selling can clearly be seen.

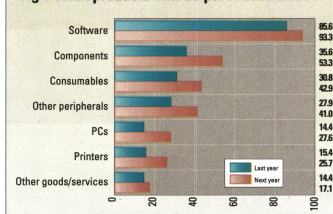
Hardware and software dealers are also being forced to rethink their strategy, as the first entrants to this market have a good chance of becoming the long-term winners. Economies of scale and dramatically increased buying (bargaining) power will mean the first companies to take advantage of the changing market will formidable competitors.

In the US, companies such as Dell and Gateway 2000 have pioneered the development of the direct-marketing channel. To develop the market, Dell adopted such techniques as being a main mover in bundling and pre-installing applications onto PCs. It has recently automated this process to allow shipping volumes of up to 400 notebooks and 800 desktop PCs per day.

Dell built market share with the help of an impressive, and expensive, multiple-page advertising campaign in the major computer press. The company has also established an excellent reputation for customer service and after-sales support.

Dell announced an increase in sales of 68 per cent for the third quarter ending last November, with a profit of \$16.6 million on a turnover of \$292 million. It is expected to announce a first quarter

Fig 1 What products will be purchased direct?



turnover (ending in May) of about \$390 million. In total, BIS CAP International estimates \$10.1 billion was spent through the direct channel in 1990.

On the software side, it is estimated that up to a third of all the software sold in the US now goes through the direct channel (including mail order).

The Australian market

As discussed in the introduction to this article, the local direct channel is relatively undeveloped. Until recently, the closest Australian hardware vendors offered was local assemblers, such as Osborne or Ipx, taking orders by phone or fax. However, the initial contact was typically made by a direct sales force.

So far, the local market has been centred on software sales and we have witnessed an increase in the number of companies competing for this business.

In last month's Monitor, we reported the findings of a survey by Computer Publication's Corporate Advisor Panel designed to track trends in the local PC marketplace.

That survey found, 'just over one-third of the sample (36.5 per cent out of 85 respondents) said they had used the direct distribution channel, although an average of only 8.9 per cent of their budget had been spent on buying direct. The same group anticipated that in the

following 12 months, 17 per cent of their budget would be spent in direct response to print-media advertisements. It would appear that the conditions are set for the direct market channel to finally take off in Australia during the next 12 months'.

This survey

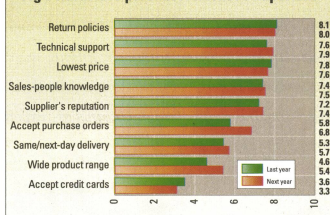
On April 28, we sent a questionnaire by post to our 292 Corporate Advisors asking them to provide further opinions on, and experience with, buying direct. At the time of going to press, we had received 194 replies, a response rate of 66.4 per cent.

The questionnaire contained three sections:

1. We asked respondents to describe their experiences during the 12 months prior to the survey;
2. We then asked if, and how, they intended to utilise the direct channel during the next 12 months;
3. Finally, we asked those respondents who had not used (and did not intend to use) the direct channel to state the reasons for their decision.

Over half of the sample (56.2 per cent) reported that they had purchased products through the direct channel during the last 12 months. As would be expected, software was responsible for the majority of the volume of sales through this channel. Over four out of five (85.6 per cent) of the respondents who

Fig 3 Hardware purchasers: what's important?



had used the direct channel had purchased software (see Fig 1).

Just over one-third of the sample (35.6 per cent) had purchased components through the direct channel and just under one-third (30.8 per cent) had purchased consumables. Interestingly, respondents were more likely to have purchased printers and/or other peripherals through the direct channel than PCs. Only 14.4 per cent of the sample had purchased at least one PC through the direct channel during the last 12 months.

Ziff-Davis recently conducted a similar survey in Europe. It found that respondents in Germany were just as likely to have purchased PCs as they were software. Three quarters of the sample for this survey had purchased PCs and 72 per cent had purchased software.

In the UK, the picture was slightly different, with 81 per cent of the sample saying they had purchased software, contrasted with just 68 per cent who said they had purchased PCs.

On average, Australian respondents using the direct channel had purchased from 3.9 companies and spent an average of \$11,019 during the last year, representing 9.3 per cent of their entire IT budget.

One in 10 (10.1 per cent) of the people who had used the direct channel were not satisfied with the service they had received.

Looking ahead, 54.1 per cent of the sample said they anticipated buying direct next year. Software looks set to retain its domination of the direct channel, with over nine out of 10 respondents who intend to purchase direct (93.3 per cent) indicating they would purchase software through this channel.

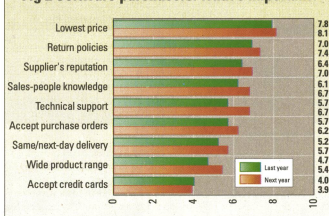
All other market segments will enjoy significant growth. Over half the sample (53.3 per cent) intend to purchase components, and over four out of 10 (42.9 per cent) intend to purchase consumables. A similar proportion (41 per cent) also anticipate they will purchase other peripherals in the coming 12 months.

Direct marketers selling PCs are set to enjoy a doubling of their client base if our survey is indicative of the entire corporate market. Over a quarter of those intending to use the direct channel (27.6 per cent) said they would be buying PCs next year. Most of this growth will come in the portable segment, with 18.1 per cent of the sample reporting they will purchase portable machines, compared with only 5.7 per cent who purchased portables last year.

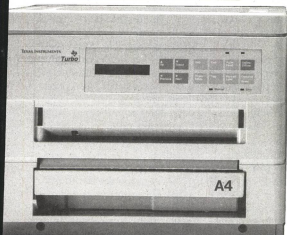
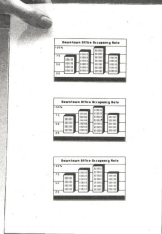
Printer distributors will also increase sales this year with 25.7 per cent of the sample reporting they anticipated purchasing at least one printer from this channel in the coming 12 months.

The average amount spent will increase to \$19,090 (up 73 per cent) and respondents

Fig 2 Software purchasers: what's important?

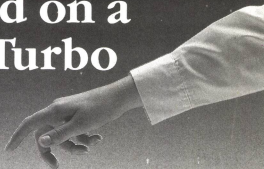


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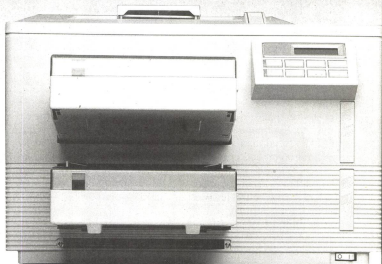


The T.I. microLaser Turbos race through Postscript graphics up to 10 times faster than competitors' printers, greatly increasing your productivity.

In addition, the Turbo microLaser can automatically be switched between MACs and PCs, ideal for



(Where's the competition?)



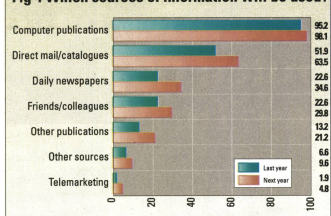
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Fig 4 Which sources of information will be used?

predict that expenditure through the direct channel will total 13.5 per cent of their entire IT budget (an increase of 45 per cent).

What's important to buyers

In a departure from overseas research to date, we decided to look at hardware and software separately when attempting to establish what concerns prospective purchasers. It would seem logical to assume that the same factors which influence people in their selection of supplier for a homogeneous product, such as software, could be very different from those factors affecting a purchaser looking for a supplier for a more complex product, such as a PC.

Our results (shown in Figs 2 and 3) confirm this hypothesis. We have shown the results from last year's purchasers separately from those from people who anticipate using the direct channel next year to identify trends in the market.

Looking firstly at software (Fig 2) it is clear that the market is very price-sensitive. A dealer who cannot negotiate hefty volume discounts with a software developer may just as well forget attempting to compete for this business. With three quarters of the sample (76 per cent) identifying price as either 'very' or 'quite' important last year, and four out of

every five prospects (80.4 per cent) giving this response for the next 12 months, there can be little doubt that price is the key to this market.

However, price was not the only factor to be identified as significant. This would imply that a dealer should be able to successfully differentiate itself in the market by listening to what purchasers want.

Buyers ranked the return or replacement policies of advertisers as the second most important criterion in their selection of a supplier (with 63 per cent saying this had been 'very' or 'quite' important in their selection of supplier, and 72.7 per cent saying it will be important). A dealer wishing to do well in this market should give prominence to a money-back guarantee in any corporate promotional material.

Reputation was the third most important attribute identified by our survey. Over half of those who had used the direct channel (54.7 per cent) said a supplier's reputation had been 'very' or 'quite' important to them, and 62.2 per cent said this would have an important bearing on their selection of supplier. Although a long-term view is needed to establish a reputation, an emphasis on consumer sovereignty is required by any serious competitor in the direct market.

Five of the remaining six attributes should also be considered by anyone thinking

about entering the direct market. Software purchasers want their orders and enquiries to be handled by sales people with a good technical knowledge. With an ever-increasing range and complexity of packages on offer, it is not surprising that the score for the next 12 months for this attribute (6.7) is a full point ahead of last year's score. Buyer's need knowledgeable advice on compatibility and hardware requirements in order to make purchasing decisions.

Perhaps the most significant finding in this section of the results is the predicted increase in the importance of technical support. Just over four out of 10 respondents (43.8 per cent) said the provision of this service had been 'very' or 'quite' important in the selection of a supplier last year, while nearly six out of 10 (57.6 per cent) assigned this level of importance to the same attribute when thinking about the next 12 months.

Added to the increasing complexity of software is the fact that some of the major developers are having difficulty in keeping up with product-support demand. These factors are creating a profitable niche for eager direct marketers to exploit.

In dealing with corporate clients, a supplier must be willing to grant credit facilities. Users responding to our survey awarded 6.2 points to express how impor-

tant this attribute will be in the coming 12 months. This result contrasts with a score of just four points (the lowest recorded by the survey) for credit-card sales. Individuals placing personal orders were more likely to rate the provision of credit-card facilities as important, a factor which should be considered if targeting the home or small-business markets.

Fig 3 identifies the factors of greatest concern to direct hardware purchasers. The most striking finding in this section is that a supplier's ability to offer the lowest price was ranked not as the first, but the third most important attribute.

A supplier's return or replacement policies and its ability to supply product support were ranked above price, with four out of five respondents ranking these attributes as either 'very' or 'quite' important.

The reputation of the supplier and the provision of knowledgeable sales people were also factors of significant concern to hardware buyers. Suppliers should also note that the provision of credit facilities will become increasingly important in this market as the corporate sector expands.

The provision of credit facilities and the depth of product range would appear to be the only two attributes becoming increasingly important to hardware purchasers.

The Ziff-Davis European

Fig 5 Why not use direct-marketing companies?



You're looking at a better business partner.

You think it's two ducks. But they're actually a powerful Korean symbol of commitment to a long-term relationship. It's also the essence of the Samsung Information business ethic.

Here in Australia our advanced 14" Super VGA monitors are used by industry and government and supplied through our dealer and OEM network. And for the past 17 years, Samsung Australia has become a better business partner for many leading Australian companies.

On the surface, each relationship was linked to product compatibility, however the truth is more of a compatibility in business, beyond product. As part of our commitment, we export in excess of \$200 million of Australian products annually. Such is the basis of long term business success.

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With our commitment to technological innovation (watch for our flicker free, high resolution, non interlaced, low radiation monitors), and

the support of a \$50 billion plus Group, our credentials as a better business partner are sounding like you should call us sooner, not later.

We believe that to do better business, two heads are definitely better than one. Especially when they are pointed in the same direction.

Right now, we are looking for more long-term better business partners. For more information call Oscar Bevz, National Sales Manager (Aust) Pty Ltd, Suite 3601, Northpoint, 100 Miller Street, North Sydney, NSW 2060. Telephone: (02) 955 3888. Facsimile (02) 955 4233.

For the name of your nearest dealer telephone (02) 955 3888.



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APC692

survey did not differentiate between hardware and software. When UK respondents were asked what they looked for when selecting a direct marketing company, return or replacement policies were identified as having some level of importance by over three quarters (77 per cent) of the sample. In second place, knowledgeable sales staff was considered important by two thirds (68 per cent) of the sample, and the provision of technical support was associated with some level of importance by 67 per cent.

The reputation of the company was considered important by 63 per cent of the UK sample, and offering the lowest price ranked fifth, with only 58 per cent saying this was a significant factor in the selection of a direct supplier.

At the same time, in Germany, just under three quarters (73 per cent) of the sample identified the provision of technical support as having some level of importance, and exactly the same proportion said knowledgeable sales people were important.

Return or replacement policies were ranked third by the German sample, with seven out of every 10 respondents awarding some level of importance to this attribute. Price ranked eighth, with only 45 per cent of the sample saying that offering the lowest possible price was important.

This quick round-up of international research suggests that what buyers are looking for changes depending on local market conditions. The important lesson here is that as the Australian market develops, local buyer expectations will, almost certainly, change. Direct marketers must keep a vigilant watch for any indications of change in the market.

Sources of information

Fig 4 shows the sources of information used to select a direct supplier. Computer magazines and newspapers

were identified as the most popular hunting ground for information on direct distributors. Virtually all of the direct clients surveyed said they had used (or will use) computer publications to find direct-response advertisers.

The second most popular source of information on direct response advertisers was direct mail and supplier's catalogues. Just over half (51.9 per cent) the people who had already used the direct channel said they had obtained information from this source. Looking ahead, nearly two-thirds (63.5 per cent) of prospective customers said they anticipated direct mail and catalogues would be used in the next 12 months. This result highlights the value of a direct supplier database; information on purchasing patterns can be used to formulate an effective direct marketing campaign.

The other sources of information identified in our survey were used by a relatively small proportion of respondents. For example, only around one-fifth (22.6 per cent) of the Corporate Advisors responding to our survey had used daily newspapers to locate direct suppliers. During the next 12 months, just over a third of prospective clients (34.6 per cent) anticipated using the daily press to locate direct suppliers.

The Ziff-Davis survey found a much clearer lead for the computer press in Europe. Over four out of five respondents (86 per cent), in both Germany and the UK, identified the computer press as a source for locating direct-response companies. The second most popular source was direct mail or catalogues, but this was identified by only one-fifth of the sample.

The emergence in Europe of specialist computer magazines tailored to the direct-marketing environment probably accounts for the differences in the European sur-

vey contrasted with the Australian results.

Barriers to growth

As discussed in last month's Monitor, given the local geographic conditions, it is surprising that direct marketing has not long since established itself in the Australian market. In our survey, we took the opportunity to discover the reasons for the apparent market resistance to this form of distribution.

Just under half of those surveyed (45.9 per cent) said they had not, and did not intend to use, the direct channel. Eight attributes were put forward as possible reasons for this decision, and these are shown in Fig 5. Four of the eight reasons were identified as important by a significant proportion of respondents.

Over three quarters (76.4 per cent) of the non-users of direct marketing said the lack of after-sales support offered was either 'very' or 'quite' important in their decision. Product support, or rather lack of it, was clearly identified as the main barrier to growth in the direct channel.

In second place, the inability to try before you buy was identified as 'very' or 'quite' important in the decision not to use direct marketers by over two-thirds of this subset (67.4 per cent).

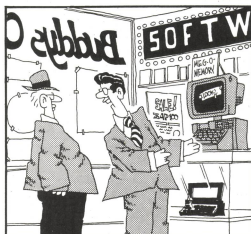
Well over half the sample (58.4 per cent) reported that a lack of confidence in direct marketing companies had been a 'very' or 'quite' important factor in their decision not to use these companies.

Finally, just over half the sample (51.7 per cent) reported that an apparent lack of technical knowledge in direct-marketing companies had been a significant factor in their decision not to utilise this channel.

These results highlight the importance of earlier findings on what is important to buyers. For a direct marketing company to succeed in the local market, it must employ (or train) knowledgeable sales people and offer product support to clients. In addition, a supplier must offer a 'no questions' return/replacement policy.

That it is still early days for direct marketers in Australia is indisputable; a call to DEC's 008 number was met with a request for name and address only. No information on my job title or anticipated level of purchase was sought. I was not even asked how I found the DEC direct number.

For established local vendors to survive, their game must be quickly lifted. With the likes of Dell and Gateway 2000 undoubtedly eyeing the relative virginity of the Australian market, there can be no time to lose.

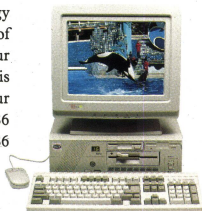


"...AND TALK ABOUT MEMORY! THIS BABY'S GOT SO MUCH MEMORY, IT COMES WITH EXTRA DOCUMENTATION, A HARD DISK - AND A SENSE OF GUILT! I MEAN I'M TALKIN' MEMORY!"

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This is your chance to air your views — send your letters to APC, PO Box 37, Sydney, 2000.

Security alternatives

Your recent excellent overview of the need for security on PC systems ('Keep it safe', APC April 1992) admirably set out the alternative approaches that were available to the commercial user.

You correctly identified encryption as probably the only truly secure way of protecting mission-critical data on systems. However, we would like to elaborate on a couple of points you raised.

The DES encryption system is not as restricted as your review suggests. There are, in fact, three broad categories of user that may import DES — US corporations as you note, banks or other financial institutions, and the Government. While these restrictions are imposed by the US Government, they are mirrored by Australian Government regulations on the sale of encryption products out of Australia.

You implied that DES can be cracked 'with enough processing power'. We suggest that it can't. The DES key is 56 bits long, and the only currently known way to 'crack' DES is by repetitive generation and testing of all possible keys. All 2^{56} of them.

Let us assume that you could, on average, find a working key in half that number of attempts. Simple arithmetic will show that even on a supercomputer capable of 1.5 million attempts per second, this exercise will take more than 750 years.

Leading cryptographer Adi Shamir has claimed that he has found a way of deriving a

DES key if enough plain text and encrypted text is available for analysis. However, even this elegant piece of cryptanalysis is only acknowledged to reduce the strength of DES from the equivalent of 2^{56} 'tries' — to maybe 2^{50} .

Where DES is vulnerable is in its key. There is no point in encrypting data to keep it private if you have to pass the key to the third party for them to decrypt it. That is acceptable in a controlled hardware environment, such as ATMs passing PINs to a bank mainframe. It is not practical security in a software implementation in normal commercial use on a PC network. The answer here is to use a different encryption technology to encrypt the DES key itself. It can then be transmitted with the encrypted message.

The Public Key Encryption systems, the most widely used of which is RSA, allow this to be done. Each correspondent on a network generates for himself two mathematically interrelated keys. One is 'secret' to himself and the other is placed in the 'public domain' for anyone to use to encrypt a message being sent to him.

The converse of this procedure also allows a sender on a network to be uniquely and irrevocably identified, a technique much in demand in E-mail and EDI applications.

RSA's own MailSafe product offers such Public Key encryption capability, together with DES (or an approved DES clone for those not authorised to use DES) to allow both secure encryption and message authentication on PC networks — at a price

in line with the other products described in your survey.

Nicholas Hough
Hicorp Marketing Services

Needless to say, Hicorp Marketing Services (02) 241 2933 market RSA's product, MailSafe. There you go, Mr Hough, you've got your free plug! — Ed.

Fair go!

I have been purchasing your magazine for many years with a little dismay as to why you don't bite the bullet and help the Australian computer user purchase products at the best available prices in the world.

We are paying inflated prices for most of our products, as the software investigation stated. The rest of the industry is similar. I purchase a magazine called *Computer Shopper* from the US and it shows how stupid Australian's are, or should I say gullible.

If the Australian importer pays more than the price advertised in the US magazines, less a nominal discount, he should purchase the goods from the US instead of Japan.

It's about time lies and innuendo stopped, and the Australian computer user, business or private, is supported. It should be fair price, good product, not fair product, highway robbery.

With these outlandish prices some companies charge, our national debt is inflated and they're laughing at us. We subsidise coal, basically give it away and then pay top price for our imports. This should be a Commonwealth Government

project as well, but I forgot the flag is more important.

On pages 91, 93 and 95 of APC April, PC Telesales advertised disks still 60 per cent more expensive than in the US, but at least we're starting to get there. Well, try and ring them and the phone has been disconnected.

We'll see if you are game enough to print this one.

Terry Huckle

Yes, Terry, we are game enough to print this one. In reply to your last paragraph, PC Telesales has apparently closed shop. We were unable to confirm further details at press time, but we'll keep you informed.

Digital Solutions: there's two of them

I'd like to confirm that a company by the name of Digital Solutions, which is listed in the Sydney phone book and whose telephone number was quoted instead of ours on page 82 of APC May, has no relationship with Digital Solutions in Queensland, a networking specialist company.

It is an unfortunate fact that Australian corporate law allowed this situation to occur until last year. We will be attempting to reconcile this matter in the future. In the meantime, I would appreciate your endeavouring to inform your staff and readers of the situation.

Paul Shortis
Digital Solutions Pty Ltd

Our apologies for the mixup. Digital Solutions' (Qld) number is (07) 883 1851 — Ed.

interlaced

A Flicker-Free Image with Shamrock Monitors

High Resolution 1024x768 14in and 1024x1280 19in Models

RC1401/1491* 14in HYPER VGA I

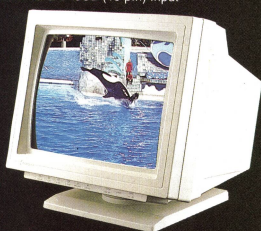
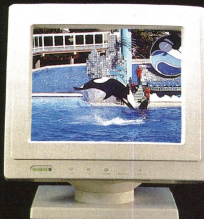
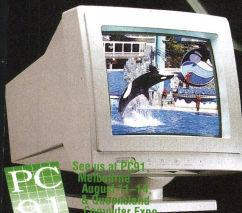
- Horizontal Frequency: 28kHz - 40kHz
- Resolution: 1024 x 768 Interlaced
- Compatible with the full range of Super VGA modes plus Apple Mac II
- 0.28 (*SCR1491 0.39) Dot Pitch CRT

SRC 1402 14in HYPER VGA II

- Horizontal Frequency: 28kHz - 50kHz
- Resolution: 1204 x 768 non-interlaced
- Compatible with the full range of Super VGA modes plus Apple Mac II
- 0.28 Dot Pitch CRT

SRC-1901 19in CAD/CAM MULTISCAN

- Horizontal Frequency: 27kHz - 72kHz
- Resolution: 1280 x 1024
- DBF (Dynamic Beam Forming)
- 0.31 Dot Pitch CRT
- BNC & D-SUB (15 pin) input



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NEC's innovation of ErgoDesign* has raised the standard of monitors with the revolutionary 3FG and 4FG MultiSync monitors.

SAFETY STANDARDS have been increased with Reduced Magnetic Field Technology, to meet the SWEDISH MPR II guidelines for lower ELF and VLF emissions.

COLOUR ACCURACY and **ADVANCED DIGITAL CONTROLS** enable you to adjust the colour to suit your individual needs and preferences, and automatic sizing and centring of screen images.

BIGGER screen size. The 15" flat square picture tube provides 36% more active screen area than conventional 14" monitors.

The **ANTI STATIC** screen eliminates dust attraction. **BRIGHTER** screen with the revolutionary Invar shadow mask to increase brightness by 20%, without loss of focus. The high contrast minimizes blurring and distortion, providing crisp, edge-to-edge images.

BETTER design with Tilt-Swivel base and sleek, European-style casing. Higher screen resolution and the higher refresh rates enable the **FLICKER-FREE** images demanded by windowing environments.

COMPATIBLE with MS-DOS based systems and the Mac II family and Quadra.™

The 4FG supports a range of video standards from VGA to 1024 x 768 (70 Hz) non-interlaced.

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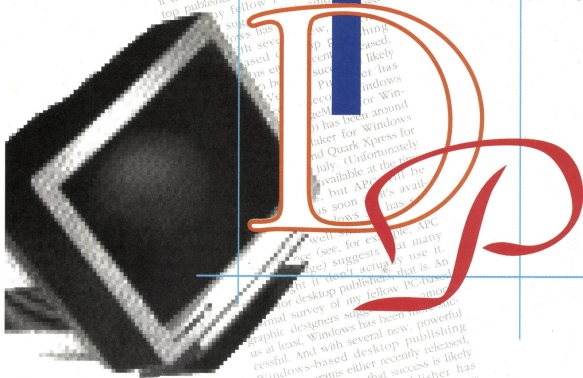
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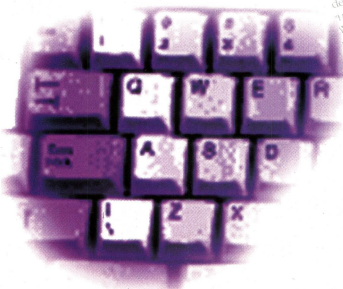
*Ergo Design is a Trade Mark.

Linux HEA005



Is this a cure for Mac envy?

Professional desktop publishers who work with PCs have often looked jealously at their Mac-using colleagues; envying their easy-to-use interface and the range of available software. Microsoft Windows was supposed to change all that, and cure us of Mac envy forever. Jim Endersby reviews three of the major Windows desktop publishing programs currently on the market and compares their features.



Although Windows 3.0 has sold exceptionally well since its launch, recent evidence (see, for example, Monitor, *APC* February, page 55) suggests that many who bought it don't actually use it. Except for desktop publishers, that is. An informal survey of my fellow PC-based graphic designers suggests that Windows has been more successful. And with several new, powerful Windows-based desktop publishing (DTP) programs either recently released or just about to be, that success is likely to continue. Ventura Publisher has recently shipped its second Windows Version (4.0), and PageMaker for Windows (also Version 4.0) has been around for a while. FrameMaker for Windows will be available this month, while Quark XPress for Windows is due in July. (Unfortunately, it was available at press time, but *APC* will be reviewing Quark as soon as it's available.)

Windows DTP: suitability to task

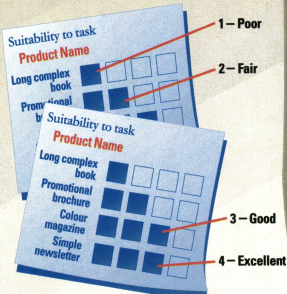
The three DTP packages reviewed are all intended as general-purpose packages, but for a variety of reasons, individual programs may be more suited to one type of publishing work than another. We rated the three products on the four types of publications that desktop publishers work on most often, and might take into consideration when choosing a package: a long, complex book; a promotional brochure; a colour magazine; and a simple newsletter.

A long, complex book From catalogues to novels, annual reports to technical manuals, most desktop publishers have to tackle a long document at some time. The capabilities that make this work easier are: automatic page, chapter, section and paragraph numbering; table of contents and index generation; automatic cross referencing; footnoting; and the ability to compile several documents into one final book. But perhaps even more important is the ability to rapidly reformat text, graphics and page layouts across an entire publication. This includes automatic table and figure numbering, and anchoring captions to illustrations and illustrations to the text they relate to.

A promotional brochure With design-intensive and prestigious work, you really need a program that will create what you've imagined (not force you to adapt your ideas to its limitations). Flexibility and a sophisticated range of features will be vital here. The ability to save and re-use styles is not important, since the brochure will almost certainly be unique. And while the ability to produce final colour separations is an advantage, it's not a major consideration, since you'll probably only have a few pages and a high budget.

A colour magazine Flexibility of design is also a feature here, but the ability to re-use formats from issue to issue is even more important. DTP is supposed to make things quicker, so a program which can do everything the traditional technology can do is of no use if it takes just as long as the traditional technology. And since magazines usually want the maximum amount of colour for the minimum cost, the ability to output four-colour separations directly to film will be a crucial consideration.

A simple newsletter This is just one of the many tasks that may confront the part-time desktop publisher, who may have to double as receptionist, writer, editor or typist. Speed of learning, ease of use, and simplicity of operation are the vital features here. But at the same time, the program's simplicity must still allow aspects of the newsletter (such as page and text formats, or the masterhead and publisher details) to be saved and re-used.



Note: the sum of the scores should not be used for product comparison, and is not a factor in determining Editor's choices.

The reasons for Windows' wider acceptance in this area aren't too hard to see — desktop publishing invariably involves using several different applications. At the very least, most of us use a word processor and a file-management utility alongside our major page make-up software, and many use drawing, painting, graphing and scanning software as well. In these circumstances, the benefits of using an environment such as Windows become considerable. A consistent interface across programs, for example, offers no real benefit to users who carry out 95 per cent of their computer work with just one application, but it can be an important advantage if you're regularly switching from one program to another.

The same is true of another much-touted Windows benefit, multitasking — the ability to run several programs at once. Again, no big deal if you only ever use one application, but a significant time-saver when you're in the middle of correcting a long document and you suddenly need to update a graphic image. In the pre-Windows world, this in-

volved saving your work, quitting your DTP program, starting your graphics program, loading the appropriate file, making the changes, exporting the file, quitting the graphics program, restarting the DTP program, reopening your work, and finally reim-

porting the graphic. Not any more. Windows allows you to keep, for example, both CorelDRAW and PageMaker running at the same time. If you need to switch from one to the other, the simple key-combination of Alt and Tab will do the trick.

Editor's choice

FrameMaker

Despite being the new kid on the Windows block, FrameMaker offers a range of impressive, powerful features. It's complicated to use and is certainly not the tool for the casual or occasional user. But for the graphic designer who needs complex formats, or the full-time professional desktop publisher who has to produce long, involved documents, FrameMaker has the best features. It is the only one of the programs reviewed that allows you to open several documents at once (you can open up to 40 at one time), and the only one that allows you to mix landscape and portrait pages within a single document (handy if you often have large tables or diagrams to lay out). In fact, FrameMaker offers up to 25 different master pages (page templates) within each document, and some or all of the formats from one document can easily be copied to others.

It lacks one or two useful options that are found in Ventura, such as automatic bullets and drop caps, and its implementation of irregular text wraps is cumbersome compared with PageMaker's; but it comes with more than enough other extras to compensate. FrameMaker's biggest weakness is in its colour support; it offers neither spot-colour trapping nor four-colour process separations. But unless colour is a major issue in your work, it'll be worth keeping an eye out for the final release version.

"the IIT maths coprocessor seems the best choice for all business applications"

PC Today, December 1991



HIGHLY REGARDED "PC TODAY" (UK) MAGAZINE GIVES IIT COPROS THE THUMBS UP:

Leading UK computer journal "PC Today" reviewed all maths coprocessors and IIT really came out on top! This is what they had to say:

"the IIT seems the best choice for all business applications"

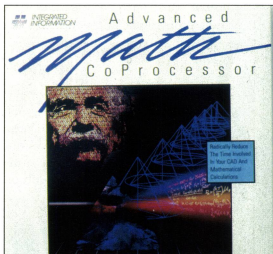
"It's certainly good value"

"fastest in the benchmarks"

If you're fitting a Maths Coprocessor you owe it to yourself to choose IIT, the proven top performer. Now with over 20,000 sold in Australia and with an unbeatable record for system compatibility and reliability. Be sure to specify "Genuine IIT" for peace of mind.

Here are just some of the 20,000 satisfied users in Australia and New Zealand:

- ASEA Brown Boveri P/L • Aust. Chamber of Manufactures
- Australian Broadcasting Corporation
- Australian Defence Force Academy
- Australian Taxation Office • AutoDESK (Aust) • BHP Engineering (NSW)
- CIG Gases • Civil Aviation Authority
- Conzinc Riotinto (Aust) • CSIRO (Computing) • CSIRO (Div. of Applied Physics) • Deakin University • Dept. of Forestry (ACT)
- Electricity Trust of SA • GeoPeko
- Honeywell (Aust)
- ICI (Explosives Divn.) • James Watt Group P/L • Julius Kruttschnitt Centre
- LaTrobe University
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DEAD!

But when it comes to integrating information from different applications, multitasking is only the beginning; Windows also offers users the Clipboard, Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE). All three are methods for getting data out of one application and into another; from the Clipboard's straightforward cut-and-paste approach to the sophistication of OLE (see the text box 'DTP+OLE = an easier life'), all are tools that will be of use to desktop publishers. Of course, all these tricks rely on Windows' ability to break the DOS 640K barrier, allowing the programs themselves to become much bigger and more sophisticated; another thing that DOS alone can't offer us.

For those who've been wrestling with bitmapped screen fonts, the Windows screen display is a delightful revelation, particularly if you use a utility such as Adobe Type Manager when you're working with Windows. The ability to install one screen driver for all your applications, and the ease of only having to install one set of fonts (which go directly into Windows itself) is an irresistible combination for those who were used to WYSIOVLWYG (What You See Is Only Vaguely Like What You Get) fonts and having to install a new, non-standard, high-resolution screen driver for each program.

The price of Windows

All the benefits offered by Windows, however, come at a cost. The software itself is not cheap, but to run such large programs at a reasonable speed, Windows requires a more powerful computer system: one with a faster processor, more RAM, a bigger, faster hard disk, and even a faster monitor and adaptor card. My last computer was a powerful system in the DOS world — a 20MHz 386 with 2M of expanded memory, a 60M hard disk and a Super VGA monitor with a VRAM adaptor. As soon as I installed Windows, it was transformed from a speed demon into a real dog. So the cost of upgrading, or even replacing hardware may have to be added to the cost of the Windows software itself.

All the products reviewed here were tested on a 33MHz 486 with 8M of RAM, a 115M hard disk and a 21in EIZO monitor powered by a Texas Instruments Graphics Accelerator (TIGA) board. Having previously run both PageMaker 4.0 and Ventura 4.0 for Windows on the 386 system described above, let me assure you that my new setup is not wildly extravagant.

A cure for Mac envy?

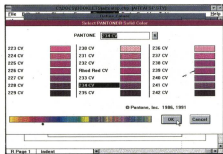
Anyone contemplating buying a new DTP system might be forgiven for wondering

why they don't just buy a Mac. A friend commented bitterly about Windows recently: "If I'd wanted a slow, expensive desktop publishing setup, I'd have bought a Mac in the first place." Well, a system like the one used in this review is still cheaper than a Mac Quadra with comparable power. While Apple is certainly cutting prices, it's not falling as fast as PC prices, and until there are cheap 'no-name' Macs on the market, they never will.

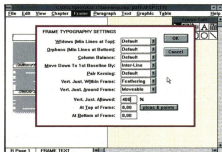
Another reason for choosing Windows, particularly in large companies and organisations, is compatibility with other users. If everyone in the building uses PCs, then a Mac-using DTP department may create file translation problems, at the very least. However, the 'Mac or PC' dilemma is rapidly becoming less of a problem, at least for desktop publishers. Ventura released its first Mac version last year and, like the other programs reviewed here, it offers complete file-format compatibility between the Mac and Windows versions. Moving fully-designed documents from one platform to the other is now relatively easy. But one word of caution — you must have the same fonts installed on both systems or problems will result.

Ventura Publisher 4.0

Ventura Publisher is the grand-daddy of all PC-based DTP programs and, as a result, it has been showing its age in recent years. The new version is supposed to free the program's users from all the limitations of the GEM version. (GEM was an early and fairly primitive GUI, which originally provided Ventura with a few of the features now provided by Windows.) It was also going to fix all the problems in Ventura's first Windows version (3.0) and entice lots of new users into the Ventura fold by offering new features such as much-improved colour capabilities, search-and-replace, spelling checking, and the ability to wrap text around an irregularly-shaped graphic (shape setting). These are all areas where PageMaker previously offered substantial advantages. Unfortunately, one of these



Colour support, including Pantone colours, is dramatically improved in this latest version of Ventura Publisher



Not only does Ventura give you an excellent range of typographic controls, but these controls can be overwritten by any particular frame or paragraph

features, irregular text wraps, couldn't be completed in time for this version.

Ventura 4.0 is easy to install from within Windows, but retains (as in earlier versions) its irritating habit of forcing you to install it in a directory called C:\VENTURA and nowhere else. If you're upgrading, this feature prevents you from keeping your old version of Ventura in a separate directory until you're completely happy with the new one (something many users might want to consider, given the unhappy experience of the previous Windows version). Apart from that, Ventura is easy to install and only takes up 3.2M of hard disk space — modest when you consider that Windows itself now hogs over 9M.

As soon as you launch Ventura, however, you begin to see trouble; it takes 60 seconds just to start up (on a 486 remember!). This is after following Ventura's advice on optimising the startup time. By comparison, FrameMaker only takes 16 seconds and PageMaker a mere 10 seconds. To give you a scale for comparison, Word for Windows 2.0 takes less than six seconds to launch on my system, so if it takes a full minute on yours, you might find yourself waiting four or five minutes for Ventura to get up and running.

As Table 1 clearly shows, the other major problem with Ventura is its printing speed. This was one of the most irritating failings of the first Windows release, yet nothing seems to have been done to rectify the problem.

Despite the test being carried out with the

new (and much improved) Windows 3.1 Print Manager, Ventura is as slow as ever. And the reason isn't hard to see, because Print Manager reports the size of the print file it has received as it prints: Ventura's is 637K and FrameMaker's is 407K, while PageMaker weighs in with a tiny 103K — small wonder it prints the fastest!

The news for Ventura isn't all bleak, however. This version builds usefully on Ventura's already impressive list of features and functions. The search-and-replace feature, for example, is both quick and accurate, although it's a pity it doesn't allow you to search for the combination of specific text with a specific paragraph format (tag), as PageMaker does. The new colour capabilities are a match for PageMaker, and Ventura now offers add-on programs called colour extensions, which further enhance Ventura's capabilities with features such as image scanning and four-colour separations, albeit at a substantial price.

But while PageMaker-like features have been added, Ventura hasn't sacrificed any of its powerful long-document handling features. Its reputation has been built on its ability to process and reformat long, complex documents quickly, and to handle automatic paragraph numbering, sophisticated header and footer options, a range of automatic cross-references, table of contents and index generation, footnotes and the like. These are all in Version 4.0 and several useful enhancements have been added to, for instance, the range of automatic cross-references. Other useful features, such as support for Object Linking and Embedding (OLE), have also been added. But what has been sacrificed is some speed. And for some users, that may be too high a price to pay for the benefits of Windows.

Overall, the new version of Ventura is not too bad, as long as your computer is powerful enough to run it. It's certainly a big improvement on the first Windows version but, as a long-term Ventura user, I can't help feeling that the company may have spent too much time on developing new products — such as the colour extensions and the new database publisher — and trying to add PageMaker-like features, in an effort to beat off the competition from Aldus. Perhaps it should have concentrated



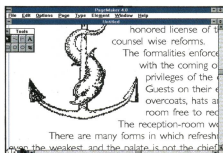
on more basic issues, such as loading speed, printing speed and the ability to open several documents at once.

PageMaker 4.0

PageMaker was the first DTP program and is still the most widely used. Unlike Ventura, PageMaker tries to mimic the process of traditional paste-up; its opening screen shows the page area surrounded by a blank paste board upon which text and graphics can be temporarily placed when working. While both Ventura and FrameMaker force the user to load text into rectangular frames, PageMaker allows you to place elements anywhere, and then pick them up and move them around.

This freedom also extends to the way PageMaker handles text. The user can choose to define and use a stylesheet (which allows you, for example, to change the typeface and typesize for all the body text in a document in one go), but PageMaker also allows you to simply define text characteristics as you go or mix the two approaches by overriding the stylesheets formatting for the occasional paragraph. Ventura, by comparison, will only allow characteristics such as spacing, alignment and tab settings to be defined for a named paragraph tag; only typeface and size can be overridden for individual words.

This means that Ventura users have to get out of awkward corners by using one-off tags with names such as 'Page 52 special'; the PageMaker user, by comparison, can just



Wrapping text around an irregularly-shaped graphic using PageMaker is simple and intuitive

Table 1: space and speed tests

	Hard disk space	Time to start program	Load test file*	Print test file
Ventura	3.2M	60 secs	10 secs	5 mins 45 secs
PageMaker	4.3M	10 secs	10 secs	3 mins
FrameMaker	8.0M	16 secs	4 secs	3 mins 58 secs

* The test document in each case consisted of 16 A4 pages of 12pt Palatino with no font changes or graphics

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- **Monitor** with software driven volume control.
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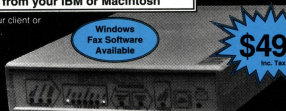
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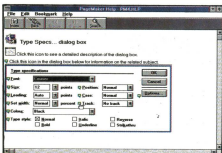
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PageMaker's help is the best organised of the three programs reviewed

click on the offending paragraph and reduce the space above it by one point, without affecting any other paragraphs.

FrameMaker follows PageMaker's approach in that it allows the user to mix and match these two types of formatting, but with either program, the freedom to override the default settings can create headaches when layouts have to be changed. The free-form paste-up metaphor which PageMaker employs can also be a nightmare if you reach page 100 in a book and realise that you have half a dozen lines of text left over. Both Ventura and FrameMaker allow you to simply shave a millimetre off the inside page margin whereby the text automatically reflows itself and your extra lines suddenly fit. But try the same trick in PageMaker and you have to reposition the text on every single page manually. Which approach to layout — automation or freedom — will suit you is partly a matter of taste, but it also depends on the types of documents you produce.

Aldus is obviously aware that many users see its product as being unsuitable for long documents, and has tried to improve its handling of this type of work. PageMaker now has automatic table of contents and index generation, for example, and allows you to combine several separate publications into a book (for printing and renumbering purposes). However, Ventura has always had these features, and neither is sufficiently sophisticated in itself to make die-hard Ventura users defect. This version of PageMaker also introduces word processing facilities, such as a spelling checker and search-and-

replace, similar to, but slightly better thought out than, those in Ventura.

As a result of all these improvements, PageMaker is now beginning to suffer from 'feature bloat' and users who were familiar with the previous Windows version will be very disappointed by PageMaker 4.0's speed. On a high-powered system, PageMaker's performance is perfectly satisfactory, but it does seem to become bogged down on a slower system, especially one with less than 4M of RAM. In particular, PageMaker's superb display quality comes at a very high price if you're stuck with a slow video board; even with the TIGA board, PageMaker repaints the screen discernibly slower than either Ventura or FrameMaker.

Printing from PageMaker is both quick and easy (see Table 1), and it handles simple spot-colour separations with consummate ease. It doesn't, however, support colour trapping (a feature which ensures accurate colour registration when one colour is reversed out of another). Ventura does support trapping, but only if you buy the Ventura Separator extension in addition to the base product.

Like Ventura, PageMaker won't allow you to open several documents at once, nor will either application allow you to bypass this limitation by running two copies of the program at once — a serious drawback which should be rectified immediately.

PageMaker's ease of use and the freedom it offers will continue to ensure it a following among graphic designers for the moment at least; but the imminent arrival of Quark XPress for Windows may put severe pressure on PageMaker in particular.

PageMaker may be in danger of becoming too big, slow and complicated to appeal

to the desktop beginners who have previously embraced it so enthusiastically, but at the same time, it's still not approaching the sophistication of long-document tools such as Ventura and FrameMaker. Aldus has to be careful not to drag PageMaker onto what appears to be a dangerous middle ground; if that happens, it may well find the competition eating into its market from both sides.

FrameMaker for Windows 3.0

FrameMaker made its debut as a Unix-based program designed to facilitate large, complex document publishing on multi-user systems. It has since migrated to the NeXT and Macintosh platforms, and this month will make its Windows debut. The version reviewed was a late beta copy, and still lacked one or two features that will be added when it's finalised. In its current form, I couldn't get FrameMaker to run under Windows 3.1 and therefore it had to be tested under Version 3.0.

This problem will be fixed in the final version, but for the purposes of this review it's worth remembering that Windows 3.1 is 10 to 20 per cent faster than Version 3.0, so the final version of FrameMaker should run a little faster than the one reviewed.

FrameMaker is clearly aimed at the long-document publisher who needs to produce complex, detailed work. It has a vast range of facilities to make long documents easier to handle: automatic paragraph-numbering, cross-referencing, tables of contents, indexes and user-defined variables.

These features are invariably more

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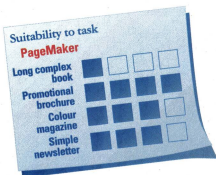
Two of the programs reviewed here — Ventura and FrameMaker — take advantage of Object Linking and Embedding (OLE), which is one of the most important enhancements Microsoft has made to Windows 3.1.

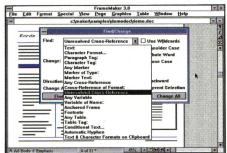
OLE allows two applications to share the same data, either by embedding data from one application into another, or by linking the data. The difference between the two is which application has control of the data. But whichever way the data is shared, OLE means that only one copy of the data is stored, and when it's updated in one application, it can automatically be updated in all applications that share the data.

This is a tool that will be of particular benefit to desktop publishers. Imagine, for example, that your company puts out three newsletters a month: one for existing clients, one for potential new clients and an internal one. The monthly sales figures need to be included in all three newsletters. Any desktop publisher who's had to carry out this type of work will be only too aware of the potential for disaster. With so many versions of documents floating around on network drives, local hard drives, floppy disks and backup tapes, it's very easy to send out one newsletter with last month's figures still in it, or even send out two different sets of figures.

OLE solves the problem by creating the data once — in a spreadsheet program, for example — and then the resulting graph can be linked to all three newsletter publications. If the accountants suddenly notice that the month's total is wrong, they can fix it and, hey presto!, all three publications are updated at once. And, of course, when next month's newsletters are created, the same process is repeated.

OLE will work on a single computer, a LAN or a WAN. The potential is virtually limitless.





The range of search-and-replace options offered by FrameMaker is positively dizzying

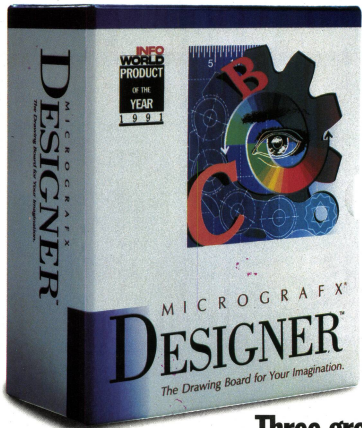
sophisticated and include more options than the comparable ones in the other two programs. The search-and-replace option in either PageMaker or Ventura, for example, will allow you to search for text, or a text format, or a paragraph format. But FrameMaker allows you to find and change any of one of 19 different options. It will search for specific Anchored Frames and even allow you to search for automatic hyphens (the ones FrameMaker inserts as it hyphenates the text), which is a very quick, and easy way to check for bad line breaks.

FrameMaker also includes a sophisticated equation generation and editing program called FrameMath. While the Ventura equation editor forces you to use arcane text commands to generate equations, FrameMath offers an icon-based palette of symbols which can easily be assembled into equations far more complex than those produced in Ventura. And FrameMath will even solve the equation!

FrameMaker also offers the most sophisticated drawing tools of any of the packages reviewed. Ventura and PageMaker both offer the standard lines, rectangles and ellipses, but FrameMaker also allows you to draw freehand Bézier curves, polygons and polylines. It also has a user-definable 'snap grid' and alignment tools, which allow you to select a number of objects, graphics, frames or text and align them all to the left or the top.

You can also 'distribute' several elements, automatically repositioning them with equal space between each one — a feature that not even a sophisticated drawing program such as CorelDRAW has. What's missing from FrameMaker, however, is the ability to draw guidelines and have text or graphics 'snap' to them, as in PageMaker. Ventura also lacks this useful feature.

Like the other two programs reviewed here, FrameMaker has a table-editing facility which can either create tables within a document or import data from another application (such as a spreadsheet). PageMaker offers these facilities via a standalone application called Table Editor, which is limited but easy to use, and the resulting



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Summary of features: Windows DTP packages

	Ventura 4.0	PageMaker 4.0	FrameMaker 3.0
Page layout			
View options	50 to 200 per cent	25 to 400 per cent	25 to 1600 per cent
Number of master pages within a single document	2 (left and right)	2 (left and right)	25
Mix portrait and landscape pages	○	○	●
Maximum pages per document	9999	999	Unlimited ¹
Maximum page size	45.72 by 60.9cm	43.1 by 55.8cm	548 by 548cm
Creates new pages for automatic text flow	●	●	●
Add/remove multiple pages	●	●	○
Move multiple pages (and contents, etc)	○	○	○
Restart page numbering within a document	●	○	○
Alignment options			
Type exact co-ordinates and dimensions for:			
Frames (containing graphics, etc)	●	○	●
Graphic elements (created in program)	○	○	●
Text columns	○	○	●
Column guides	●	●	●
Free-form guides	○	●	○
Snap to guides	N/A	●	N/A
Automatically align and distribute objects	○	○	●
Fonts and typography			
Maximum point size	999pt	650pt	400pt
Rotated text:			
90 degree increments	●	●	●
Any angle	○	○	○
Coloured or tinted type	●	●	●
Text formatting			
Uses stylesheets:			
Paragraph styles	●	●	●
Text styles	○	○	●
Table styles	○	○	●
Colour			
Spot-colour separations	●	●	●
Pantone™ support	●	●	○
Four-colour separations	● ²	●	○
Long document features			
Combine several files into a publication	●	●	●
Archive/copy all linked files together	●	○	○
Create Table of Contents and Index	●	○	●
Automatic paragraph numbering	●	○	●
Automatic footnotes	●	○	●
Automatic cross-references	●	○	●
Graphics			
Basic drawing tools (box, line, circle, etc)	●	●	●
Advanced drawing tools (polygon, group, flip, etc)	○	○	●
Imports wide variety of graphic formats	●	●	●
Place graphics directly on page	○	○	○
Place graphics into frame	●	○	●
Anchor frame to text	●	○ ³	●
Wrap text around irregularly-shaped graphic	○	●	● ⁴
Documentation			
User and reference manuals	●	●	●
Printed tutorial with tutorial files on-disk	●	●	●
Onscreen tutorial/demonstrations	○	○	○
Sample files, templates, etc	●	●	●

¹ Dependent on system memory

● — Yes

m — No

² With Ventura Separator which has to be bought separately³ PageMaker only allows a graphic to be anchored within text, which has very limited use⁴ It's cumbersome but possible

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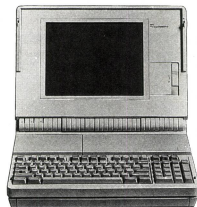
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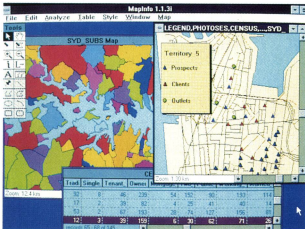
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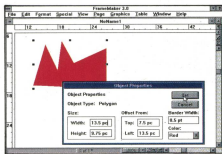
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Any FrameMaker frame, graphic, text column or other object can be precisely positioned and scaled using the Object Properties dialog box

tables can be embedded either into PageMaker documents or other programs. Ventura implements the same facilities within the base program and offers a few improvements over those in PageMaker.

But FrameMaker offers the most sophisticated options. It's the only one of the three programs which allows you to highlight part of the text, regardless of whether it was typed in FrameMaker or imported from a word processor, and convert it to a table (it gives you the option of treating either tabs or spaces as column delimiters). It also allows you to define and store a range of table

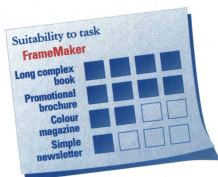
formats which can be applied to any table — a feature that allows a rapid and complete reformatting of every table using a named format and which neither of the other programs offers.

The power of FrameMaker is in the combination of stylesheets (similar to Ventura's) and direct formatting (as in PageMaker). It has a paragraph format catalogue (just as in Ventura or PageMaker) which is defined using a window of 'nested' dialogue boxes.

Normally, in any Windows application a dialogue box must be cleared by selecting either OK or Cancel before you can complete any more work. This means that if you want to review the range of typefaces and sizes you've used within a document, you have to select each style (such as subhead, body text, page head, etc), open the Font or Type Specs dialogue box, check the details and then close the dialogue box before you can select the next style. But because FrameMaker implements these options via a window, not a dialogue box, it can be left open while you select the styles; as each style is selected (using the mouse) the information in the window changes. The same approach is used elsewhere in FrameMaker, with the find/change window, for example.

FrameMaker is also the only one of the three programs that allows you to define and store a catalogue of text formats separate from the paragraph formats. These allow you, for example, to define a style called Emphasis which changes both the typeface, size and weight of the selected text. This is quicker than having to remember and apply each aspect separately, and, as with a paragraph format, it allows you to reformat all the text tagged as Emphasis in one go.

The only real drawbacks I found in FrameMaker were that it's relatively slow, and requires a lot of disk space and RAM to run effectively. But if you have an appropriate system, it's impressive.



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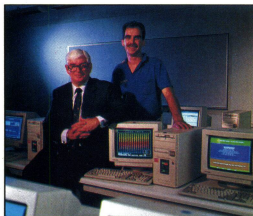
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Softcomp Technologies have won the Queensland University of Technology's recent computer tender. Installation and networking of over two hundred Softcomp Red Ribbon 486-33MHz computer systems has begun at the new Information and Technology building at QUT's Gardens Point campus. In a highly competitive tender, Softcomp defeated offers submitted by a wide range of national and international contestants. With their own range of computers, extensive product knowledge and follow-up service, Softcomp is one of Queensland's leading computer manufacturers. It is refreshing to see an Australian-owned and operated company outshining its competition in both quality and service.

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Get closer to your computer ... from afar

Remote-control software allows you to transfer files, access networks and run programs from a distant computer. Steve Gilliland and Michael Shannon screentest file-transfer packages that are capable of remote control.



Remote-software lets you dial up a distant computer and use it (almost) as if you were sitting right there — it will let you run the 100M office 486 from the 10M 286 you have at home. Furthermore, remote-access programs can save you from a trip back to the office if you forget to load files onto your laptop before leaving.

Whether you need to run programs, transfer files, tap into a network, or help someone learn a program while you assist from afar — all are no problem for most remote-control packages. But knowing that doesn't mean the choice of remote-control software can be made lightly.

Among the programs we examined, some treated remote control as a secondary feature. Central Point's Commute and Microcom's Carbon Copy Plus give remote control top billing. On the other hand, Hilgraeve's HyperACCESS/5 is primarily a sophisticated communications program with bulletin-board capabilities, while Rupp's FastLynx has added remote control — but not modern capability — to its file-transfer programs.

Buzzword bashing

'Remote control' provides the ability to completely take control of a computer, other than the one you're using, while connected by modem and phone line, a network in some cases, or directly connected via serial or parallel ports and a cable running between the two machines.

The 'host' or 'slave' computer is the one you are calling. The one you use to call is referred to as the 'guest' or 'master'. Some, but not all, remote-control programs have a chat mode by which users at each machine can exchange onscreen messages during operation.

File-transfer programs are designed primarily for moving data quickly from one computer to another by direct connection. Though most remote-control programs — including all of these — can transfer data between host and server, not all file-transfer programs are capable of remote control.

All the programs we looked at have remote-control capability.

Of modems and cables

Some of these programs come with their own direct-connect serial and parallel cables. If your software doesn't, you will need a null modem serial cable configured according to instructions in the manual.

The serial cables furnished with FastLynx and Carbon Copy Plus are hydraheaded, with both 9 and 25-pin connectors. If you need a cable, note whether the betrothed computers are 9 or 25-pin. Parallel cables are usually furnished with the software. There must be a DB-25 male connector at each end to match the LPT ports on each computer.

Data-transmission speed is measured in bits per second (bps). While you can find fantastic deals on 300 or 1200bps modems, if you're buying today, don't settle for less than 2400bps.

One speed and lack thereof

Remote control is wondrous, but not perfect. The most annoying aspect is that modem-based remote control is slow. It takes much more time to pass bits through wires single file — even using 115,200bps directly connected serial connections — than to move them shoulder to shoulder on your computer's 16 or 32-bit-wide internal bus.

At the 2400bps operating speed of today's popular modems, data moves between the two computers at 250 to 300 bps. 9600bps is four times faster; 1200bps is half as fast. Even with the data compression sported by each of the programs, that's very slow.

Of course, if you plan to use remote control locally, perhaps as a zero-slot LAN — allowing several computers on a LAN to interact without using the file server (Carbon Copy Plus and Commute can do this) — you operate at LAN speeds, usually fast enough to run most applications, though still too slow to run Windows effectively.

Direct connections by parallel cable (always faster than serial), as well as serial-port hookups running at or near the 112,500bps maximum, will run text-based applications quickly, but don't bet the rent on graphics running quickly. Therefore, modem control of Windows, for instance, is out at anything less than 9600bps. Redraw of Windows graphics screens is just too slow, at least with the present generation of remote-control software.

Direct connect is likewise untenable. Commute can run Windows as slow as 2400bps, but just loading the program takes 15 minutes worth of waiting for screen updates. The other programs couldn't manage Windows except in LAN mode.

(Some firms are releasing new versions that purport to allow running Windows by remote control — such as Carbon Copy for Windows, reviewed in First Looks, APC April — but none are reviewed here.)

The awful truth is that remote-controlled graphics applications of any kind are lamed and sometimes halted by modem linkage, and may be cantankerous even with high-speed serial or parallel communication. In fact, using anything other than text-based DOS applications for non-LAN remote-control work will be disappointing. A remote computer CPU freeze can end your session permanently, or at least until someone does a hardware reset.

Each of the four programs on the PC side installed easily. After installation, each package was up and running, using only careful attention to menus and the oc-

casional resort to onscreen context-sensitive help. The most difficult installation was Carbon Copy Plus, but the problems arose from careless reading of the manual.

All the programs matched and matched DOS versions from 3.3x to 5.0, even when one computer was running DR DOS 6.0 with its SuperStor compressed hard disk in place. Three different 386 machines and a 286 all ran well as host or server.

Within the above-mentioned speed limitations, remote-control operations for all these programs are much the same. Almost a dozen character-based applications, from WordStar to PC File, ran without flaw on all programs, as easily as if you were actually present at the remote PC.

Commute 7.1

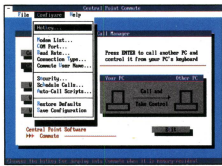
Sold by Central Point Software's PC Tools Package (\$285), or separately for \$205, Commute is the premier remote-control program and the best of those reviewed for the PC.

Pull-down, mouse-controlled menus make it easy to gain access to the remote PC or LAN. Commute was the only program tested able to run Windows via modem, though glacially slow screen updates made doings so impractical.

The server PC can drop out of the connection to run its own programs, then return to the remote connection. The chat mode pops up at any time with a hotkey request from either host or server.

A scripts editor allows scheduling and automation of unattended operation. Security features include host PC password, a call-back feature (the host answers the call-in, hangs up and dials back) and predefined access limitations, as well as reboot protection. PC Tools owners can also use data encryption for further safety, and a virus scanner checks incoming files.

Commute has a few faults, among them a somewhat slower data-transfer rate than some of its competitors. For everyday remote-control work, however, this is the best buy. Commute is available from PC Extras, tel (02) 319 2155.



Commute's pull-down, mouse-controlled menus make it easy to gain access to the remote PC or LAN

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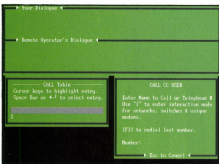
LESS

Carbon Copy Plus 6.0

Microcom Systems' Carbon first brought remote control to the PC. Carbon Copy Plus retains its solid remote-control features, while removing such headaches as demanding purchase of a separate program for host and server.

A new terminal emulator means the software can act as a limited communications program for access to E-mail and bulletin boards. The command interface used for operations such as file transfer from host to server is similar to entering DOS commands.

Like Commute, Carbon Copy Plus has local area network capabilities. One LAN computer can control one or many of the other LAN workstations. An outside PC can



The menus are plain and cryptic, but Carbon Copy Plus still gets the job done

call in, take control of a LAN PC and, in turn, control other PCs on the network.

File security is as tight as it needs to be — the host is protected by multilevel password and call-back features. Carbon Copy Plus is a solid remote-control player. The chat mode is awkward and file-transfer rate is low, but LAN capability and terminal emulation make it a sound choice.

Carbon Copy Plus is available from PC Plus Systems, tel (03) 528 2311.

HyperACCESS/5 2.0

Billed primarily as a communications program, HyperACCESS/5 2.0 (\$297) makes good use of remote control and is the only one to combine DOS and OS/2 in the same package (a DOS-only version is \$148). This means a PC running OS/2 can call a DOS computer.

A virus filter screens 130 common infections, and the script language includes IF, THEN, ELSE statements, and GOTO and GOSUB commands — the most sophisticated script facility of any examined.

Security includes up to 250 passwords, allowing HyperACCESS/5 2.0 to act as an unattended BBS. As with many programs, host access can be restricted by users, but there is no data encryption.

A dozen file-transfer protocols, support for more than 100 modems, and 17 terminal emulations give this program broad remote-control capability. However, the



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FastLynx

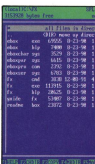
FastLynx is the 1st in the docket. Conceived as a way to move files from one computer to another, it moved files from one computer to another faster than any of the other programs. The program is excellent for moving files between cables.

Remote control is an afterthought, modem and lacks only by direct con

FastLynx enables CONFIG.SYS device drivers to be loaded on the client and server. Once installed, it automatically answers for the drives on the host as if they were local to the server as its own. Very simple, no confusion, it simply works.

FastLynx isn't the only program that need only unsecured connections. This incredibly simple program is an excellent

FastLynx is available
tel (02) 427 7999.



Originally conceived
FastLynx is the fastest
programs reviewed
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LapLink Pro 4.0 for remote transfer

Proliferation of remote-control software is a relatively recent phenomenon, but file-transfer utilities have been around since the advent of the first portable computers more than a decade ago. Users with two or more computers needed to transfer data faster than by floppy.

Traveling Software's LapLink was among the first of these utilities, and it's still one of the best. The latest version, LapLink Pro 4.0, now enables remote transfer by modem as well.

All of the software packages examined here can transfer data by direct connection, and all but FastLynx can use a modem as well. But routine transfer of large amounts of information by modem is inefficient and, if done over long distances, expensive as well.

However, for those who need to transfer files remotely but don't need remote-control capability, LapLink is a solid alternative. Next to FastLynx, LapLink Pro exhibited the fastest file transfers among the PC products.

LapLink Pro supports more than 60 different Hayes-compatible modems, and built-in discrimination lets it automatically configure itself so you don't need to be familiar with the intimidating world of parity, stop bits and protocol.

LapLink Pro can automatically 'clone' itself —

that is, move LapLink programs to the remote computer — by direct connection or modem. For LapLink installation by modem, the host must have a modem waiting for a call. A Batch utility adds macro capability. By turning on the Recorder, a series of commands is automatically captured for later use.

The Synchronize command makes selected directories in two drives identical, automatically copying new files from one directory to the other. When a file with an identical name is encountered in the other directory, LapLink selects the latest time and date stamp, deleting the other file.

Like Carbon Copy Plus, LapLink can communicate regardless of the hardware on the two systems. (In times past, one computer with a monochrome adaptor had trouble talking to another with a graphics video card.)

As with all of the software reviewed, LapLink Pro doesn't work with Windows, though Traveling Software's new WinConnect (not reviewed here) is said to handle the Windows environment.

In summary, LapLink Pro is a good program. If you have no need for remote control, the dedicated local or modem data transfer of LapLink is one of the fastest, and it's far more versatile than many of its competitors.

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The tale of Windows



3.0 and OS/2 2.0

After a year filled with rumours and innuendos, Microsoft and IBM have delivered the goods. Michael

Miller tells the tale of two operating environments—each with its own historical baggage and a future vision.

The competition between Microsoft and IBM over operating environments has been the hottest topic in computer software over the past year and a half. Microsoft's decision to promote Microsoft Windows and leave OS/2 behind has made fierce competitors out of the two firms; the same two firms that once routinely appeared together to explain their joint operating systems strategy.

Each company has waged a war of words in promoting its operating systems strategy, with both firms only too happy to disparage each other's products. This state of affairs persists even though Microsoft and IBM worked together in creating OS/2 and both have licensing agreements for each other's products.

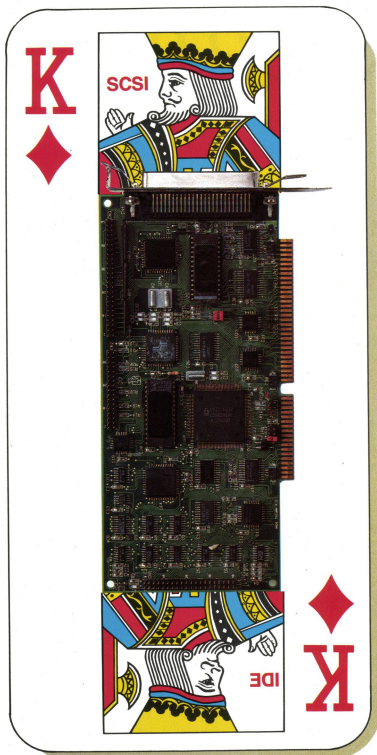
For months, Microsoft has been saying how good Microsoft Windows Version 3.1 will be; IBM has been saying how much better OS/2 Version 2.0 will be. But now the products are here, and they will have to stand on their own.

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first to bring you product reviews, we presented these two contenders in our April issue. Since then, we have further examined both offerings, and in this special report, we take a close look at both Windows 3.1 and OS/2 2.0.

The Windows of opportunity

Microsoft first announced Windows in 1985 (the company had been previewing it for years, originally under the name of Interface Manager). Despite lots of fanfare, that first version of Windows failed to take the market by storm. So did several subsequent versions, although they did lead to the initial Windows versions of applications such as Micrograph's Charisma, Corel Systems' CorelDRAW, Microsoft's Excel and Aldus' PageMaker.

Everything changed when Windows 3.0 shipped in May 1990. Windows 3.0 offered a better graphical user interface (GUI), support for extended memory, and a host of user interface changes and speed improvements that made the environment much more popular.

The improvements in Windows 3.0 also led to a flurry of Windows development, resulting in thousands of applications that covered all of the mainstream categories. In fact, almost all significant software developers are now concentrating on Windows applications. Microsoft reports that over nine million copies of Windows have been sold since the introduction of Windows 3.0.

Windows 3.1 is the first significant upgrade since Windows 3.0 was introduced. Although Version 3.1 contains a number of new features and improvements, it is nowhere near as significant a change as Version 3.0 was. However, any serious Windows user will want to consider upgrading immediately to Windows 3.1. The environment is simply more stable. The dreaded Unrecoverable Application Error (UAE) message is gone, and has been replaced by more descriptive messages.

More important, these messages should

appear much less frequently in 3.1. Microsoft has devoted a major effort to improving memory protection and preventing applications from writing to areas of memory that they do not own. For example, Windows 3.1 has patches to trap certain applications that break the Windows rules and then make sure these applications work anyway.

Although Windows 3.1 maintains the same basic interface as Windows 3.0, it extends the interface in several ways. The biggest addition is TrueType, an outline font manager that gives you scalable fonts that you can use with all Windows applications. TrueType is a big step forward for those people who have been using bitmapped fonts or the fonts that came with Windows 3.0.

TrueType fonts take up relatively little disk space and can be scaled to any size. Thus, TrueType does the same basic job that standalone products such as Adobe Systems' Adobe Type Manager and Bitstream's FaceLift have been doing, but TrueType uses a new type format. Existing fonts can be used with TrueType or can be converted to TrueType format with a third-party conversion software product. But if you use conversion software, be prepared for some loss of quality.

Windows 3.1 also features built-in support for Object Linking and Embedding (OLE), which lets you embed or link data from one application to another. This feature lets you create compound documents where you can, for example, click on a chart in a word processing document and automatically return to your charting application so you can easily update and edit it. Some applications already on the market with this feature are Microsoft Excel 3.0, Microsoft Word for Windows 2.0 and Lotus' Ami Pro 2.0.

Although OLE has already been implemented in several Windows 3.0 applications, it is standard with Version 3.1 and is part of its accessories, including Write and Paintbrush.

Support for sound also comes in the new

basic Windows package. In the past, audio support was only available through the Multimedia Extensions for Microsoft Windows, bundled with multimedia PCs and upgrade kits.

Windows 3.1 features a completely revamped SMARTDrive disk cache that includes write-back caching. The File Manager has been completely rewritten. And Windows 3.1 provides screen savers, better drivers and network support, and generally faster operation.

In the process of testing Windows 3.1, Microsoft set up a prerelease beta program that included over 15,000 sites. Versions of Windows 3.1 have been stable if not perfect for months, and many of us at APC have already made it our primary operating environment. It offers enough advantages, particularly in stability, that almost every Windows 3.0 user is going to want to upgrade. Those who were reluctant to move to Windows may find that Windows 3.1 makes it safe to jump into the water.

The OS/2 challenge

Back in April 1987, while Windows was still languishing, IBM and Microsoft jointly announced a new operating system: OS/2. At the time, OS/2 was touted by both firms as the logical successor to MS-DOS. OS/2 was designed from the ground up as a multitasking, multithreaded operating system that made use of the protected-mode operation of the Intel 286 and subsequent chips.

When it was first announced, OS/2 had several advantages over DOS and Windows. It allowed for larger applications, it allowed applications to be run simultaneously, and it was a much more protected operating system. One application crashing was less likely to bring down the whole operating system and your other applications along with it.

Even though OS/2 overcame some hefty technical barriers, it met with limited success. Early versions were not very compatible with existing DOS applications, driver support was limited, and the operat-



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Decisions, decisions

Five reasons to buy Windows

- 1. You can create documents rich with fonts, graphics and more** Once you have experienced complicated word processing in a graphical environment such as Windows, you will never be satisfied with DOS-based word processing again. The same is true if you want to put fonts and graphics in other applications, such as spreadsheets.
- 2. You can run multiple applications** Windows applications are designed to be run concurrently, so you can easily load word processing, spreadsheet and graphics programs all at the same time.
- 3. You can combine applications** Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE) give you more options for sharing information among applications than anything else currently available.
- 4. If you do not like Windows, you can always remove it** Windows is easy to remove — or to ignore.
- 5. All major developers are focusing their resources on Windows** Every major developer we talk with is concentrating its efforts on making great Windows programs and then porting to other environments, such as OS/2.

Five reasons not to buy Windows

- 1. You have to relearn your applications** No matter how compatible the Windows version of your favourite application is, you will have to learn different ways of working under Windows to take advantage of the new features and new environment.
- 2. Windows is slower than DOS** The fastest DOS applications are always quicker than the fastest Windows applications at tasks such as data and text entry. DOS doesn't produce fancy fonts or menus, but it does give you speed.
- 3. There are still more DOS applications than Windows applications** This will be true for the foreseeable future, particularly in vertical markets. Of course, you can run DOS applications within Windows, but if you don't need Windows applications, why bother?
- 4. You do not have the hardware** Don't even think about Windows unless you have a 386SX or better with at least 4M of memory and at least a 60M hard disk. The same is double for OS/2. If you are a 286 user and you still want a graphical environment, there's always Geoworks Ensemble.
- 5. If you want multitasking, DESQview does a better job with DOS applications** DESQview is faster and simpler and has far fewer system requirements than Windows. You can even run Windows in Standard mode within a DESQview window (though this is not recommended for the faint-hearted).

Five reasons to buy OS/2

- 1. You have already developed internal OS/2 applications and do not want to move them to Windows** You bought IBM's and Microsoft's hype the first time around, and now you're stuck.
- 2. You need to develop a high-end application that requires 32-bit processing and a real multitasking, multithreaded environment** This is where OS/2 really shines. OS/2 provides these features today, while Microsoft is only promising them for Windows NT.
- 3. You need an application that requires multiple communication sessions** OS/2's multitasking, multithreaded features really make this work. DOS and Windows applications can try, but they just don't have the necessary protection.
- 4. You are an IBM-only shop** In this case, you don't need any other reason.
- 5. You are ready to meet the future today** Someday soon, we will all have 32-bit true multitasking operating systems, but OS/2 is here now. Just remember that the pioneers are the ones with the arrows in their backs.

Five reasons not to buy OS/2

- 1. There are few applications** Sure, you can run DOS applications under OS/2. You can do this on a Mac, too, with proper software. You can also run Windows applications under OS/2, though not as smoothly as you can under Windows. But the reason to choose an operating system is access to unique applications. Most software companies are still concentrating on Windows.
- 2. Unix already offers a 32-bit multitasking operating system** Unix has been available for a lot longer than OS/2, and you may already be using it. Also, Unix supports a graphical environment, at least in the form of SCO's Open Desktop. But don't even think about running Windows applications.
- 3. You can only run some Windows applications** Yes, you can run most Windows applications within OS/2. But the process is far from simple, and applications still don't work as well under OS/2 as under Windows.
- 4. The installation process is ridiculous** A full installation of OS/2 takes up 30M of disk space and nearly an hour of your time (if you get it right the first time) — and this is without installing any real applications.
- 5. You inherit the problems of three operating systems** You will spend a lot of time in OS/2 desperately trying to remember which application is running in which environment, and you will experience the problems of all three environments.

Michael Miller

ing system was considered too slow and too big to be run on the popular and affordable machines of the day.

As a result, sales were slow, and relatively few mainstream OS/2 applications ever appeared. But OS/2 was received favourably by many corporate developers, particularly for server-based applications (such as client/server databases) and applications that required multiple communications sessions.

Although subsequent releases of OS/2

fixed many of its more obvious problems, sales remained relatively modest. When OS/2 first came out, Microsoft and IBM positioned Windows as a transitional operating environment; Windows users would one day move to OS/2. But after OS/2's sales proved disappointing and Windows 3.0's sales took off, Microsoft started focusing on Windows and its successors. Meanwhile, IBM remained committed to OS/2 and took over the primary development responsibility for OS/2 2.0.

OS/2 2.0 is a substantial step forward from previous versions. It includes a 32-bit programming interface, so developers can write 32-bit applications, which theoretically can be faster than the 16-bit applications normally created for Windows or OS/2 1.x. In addition, OS/2 2.0 is scheduled to include a 32-bit graphics engine that should provide a substantial speed advantage for applications. (The graphics engine will be available sometime in the third quarter.) And OS/2 2.0 continues to be a true multitasking, multi-

threaded operating system, with all of OS/2's traditional advantages for client/server applications and applications that require multiple communications sessions.

Perhaps the biggest change is compatibility, however. IBM appears to have learned a lesson from the complaints about compatibility that dogged OS/2 1.x. Not only is the DOS emulation within OS/2 greatly improved, but you can now boot DOS itself in a DOS window. IBM is positioning OS/2 as 'the integrating environment', able to run DOS, Windows and OS/2 applications simultaneously.

IBM officials have even described OS/2 2.0 as 'a better DOS than DOS and a better Windows than Windows'. This description should be taken with a grain of salt. From a technical standpoint, OS/2 2.0 appears to be a 'better DOS than DOS'. Of course, the same can be said of DESQview, which is much simpler to install, or Windows. OS/2 2.0 lets you run multiple DOS programs at the same time; each application can have more memory available than under DOS. You can also selectively load and assign drivers to individual DOS sessions if needed, but this can be complicated. The latest version of OS/2 we were able to test implemented the seamless Windows feature. This lets you run multiple Windows applications, each in its own window, on the OS/2 Workplace Shell Desktop. In our tests, this worked surprisingly well; most applications worked with reasonable but not stellar performance. There's even a utility you can use to implement DDE, but not OLE, between Windows and OS/2 applications.

On the other hand, installing Windows applications on your OS/2 desktop is not as straightforward as it is on a Windows platform. And you are limited to running Windows applications in VGA resolution (640 by 480 with 16 colours); higher resolutions are not supported. We also uncovered a few specific compatibility problems that must be fixed.

Still, Windows support within OS/2 has come a long way very quickly. OS/2 users will now find it acceptable to run Windows applications, even though this alone is not a compelling reason for Windows users to switch to OS/2.

The improved Windows and DOS support will be important, however, if OS/2 is to find a place among desktop computer users. While many major developers have committed to port their applications to OS/2, there are currently far fewer general productivity tools available in OS/2 versions than in DOS or Windows versions.

IBM is also taking a major departure in user interface with OS/2 2.0. Instead of the Presentation Manager user interface used in previous versions, OS/2 2.0 sports an entirely new interface called the Workplace

Shell. (The old shell is available as an option.) The Workplace Shell is an object-oriented interface that works more like the Macintosh than either Presentation Manager or Windows. The Workplace Shell no longer has a menu bar across the top, but instead uses the right mouse button to bring up pop-up menus with choices for each object (such as a file or a folder).

There are some advantages to the Workplace Shell. You can create copies of objects in the Workplace Shell, so you could keep objects pointing to a document in both a word processing folder and a project folder but still have only one version on your machine.

The Workplace Shell represents a big departure from the way most people use the operating environment, particularly in the object orientation and use of the right mouse button. Early versions appeared to have a steep learning curve, especially for people accustomed to other graphical environments, but IBM has corrected this in the shipping version.

Currently, OS/2 appears to be best suited for people developing in-house applications that rely on its special features, and for people who use OS/2-specific applications along with some DOS or Windows applications. General users probably won't find OS/2 a compelling environment because of the complexity and size of the environment (a full installation takes about 30M); the relative difficulty of installing and maintaining it; and the lack of many applications native to OS/2.

Other choices

While Windows 3.1 and OS/2 2.0 are grabbing most of the headlines today, there are other operating systems in the wings. Microsoft is readying Windows NT, a 32-bit operating system that should be able to run existing Windows applications without much modification. Windows NT should also let developers add 32-bit features to their existing Windows applications and provide better and more sophisticated security features. The Santa Cruz Operation (SCO) already offers Open Desktop, a 32-bit graphical, multitasking operating system based on Unix. Other Unix-based GUI operating systems are now being ported to the Intel-compatible architecture from other machines, including SunSoft's Solaris and NeXT's NeXTstep. And an Apple and IBM venture called Taligent is developing new object-oriented operating system technology. (For further reading refer to 'The Power PC', *APC* March.)

You can expect to see many of the same features, no matter which operating system prevails. It will be a 32-bit environment designed to run on 32-bit machines based on Intel 386 and 486 architectures. The

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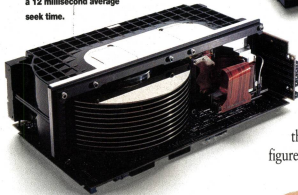
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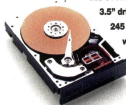


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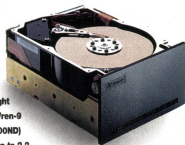
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system will be graphical, with icons and either pull-down or pop-up menus and multimedia support. It will let you simultaneously run multiple applications, and offer better support for networks, connectivity to larger systems and multiple communications sessions. Further, it will most likely feature some object-oriented features, such as being able to control the properties of individual parts of the system and embed applications within other applications.

In the short term, this may be confusing, but the result is likely to be more sophisticated, more robust applications. If developers can keep their user interfaces evolving as the operating systems become more powerful, applications may even become easier to use. But one thing is certain: you will need more and more hardware to get the most out of your applications.


A farewell to DOS?

Does this mean the end of DOS? Of course not. Many people who currently run DOS-based applications or have less powerful hardware are content with their current operating system.

Both Microsoft and Digital Research are

planning future versions of their DOS products. Most major software developers, except Microsoft, plan continued upgrades of their DOS applications.

So while GUIs do not mean the end of DOS, they do mean that new applications — those that provide graphics or require multitasking — are likely to be developed

for the new environments. For many people, this will mean a big investment, both in more sophisticated hardware and in learning new ways of using their computers. Judging from the initial acceptance of Windows and Windows applications, many users will believe this investment is well worth the cost. 



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WINDOWS 3.1

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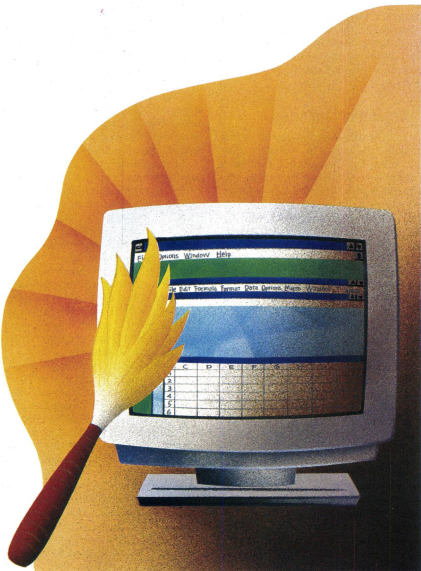
An end to UAEs, a new print engine, a smarter SMARTDrive and more. As Gus Venditto explains, Microsoft adds the polish to make Windows a stable and rich environment.

Microsoft Windows Version 3.1 is not the minor upgrade that its modest name change suggests: it's a thorough overhaul with bug fixes, performance enhancements and significant new features. If you've been sitting on the fence waiting for Microsoft to fix the problems with Windows, Version 3.1 is your chance to act. Most of the rough edges are now smooth.

Windows 3.0 was plagued by instability in the form of Unrecoverable Application Errors (UAEs), which caused system crashes. The UAE problems are largely solved in Version 3.1. Microsoft has distributed three major releases of the preview version since June last year to thousands of testers; the last one, which this review is based on, was shipped in January.

Many of the situations that used to cause UAEs seem to no longer be a problem. Microsoft officials claim the solution is better parameter checking, which prevents the memory overwrites that caused UAEs to occur in the first place.

The performance enhancements are the result of a vastly improved disk cache, a new printing system and an overhaul of the internal code. You won't be overwhelmed by the performance improvements unless



you have plenty of RAM to spare. On systems with less than 4M, Windows 3.1 will seem only slightly faster. But if you have plenty of RAM, you'll find features such as SMARTDrive's new write-back cache to be a welcome change.

It also helps to be running a 386 or better: Windows 3.1 will show more improvement on a 386 than on a 286 or 386SX, since some of the enhancements take advantage of 32-bit data transfers.

On the other hand, if you've resisted Windows because you dislike graphics environments, or you don't want to invest in the hardware, there's little in Version 3.1 that will change your mind. In fact, Microsoft has made the platform even more graphical and written off the constraints of 8086 Real mode. Windows 3.1 requires more RAM than before and only has two modes: Standard and 386 Enhanced. It will run in Standard mode on systems with only 1M of RAM, but not very well.

The improved stability and speed are the most important part of the story, but there are many exciting subplots. Other new features range from major additions such as object linking and embedding (OLE), the integrated WYSIWYG printing system, TrueType fonts, and sound functions and small enhancements, such as a Startup group that works like a Windows version of AUTOEXEC.BAT and a Character Map utility that solves the problem of having to use special ANSI characters.

The dreaded UAEs: less frequent and renamed

Microsoft's official position on the haunting UAEs that afflicted Windows 3.0 is that non-Microsoft programmers were to blame. UAEs usually occurred when one programmer wrote to a memory address already claimed by an earlier program or when it attempted to invoke a function with program code that Windows could not understand. Microsoft claimed that if programmers played by the rules and thoroughly debugged their own programs, these problems wouldn't occur.

Fortunately, Microsoft has taken aggressive steps to solve the UAE problem. There's improved parameter checking in Windows 3.1, which attempts to prevent programs from stepping on each other's memory. And when UAEs occur, you won't encounter the uninformative messages in Windows 3.0; Microsoft has replaced the generic UAE message with more than half a dozen new messages with useful information about the error.

The new error messages are more specific and have informative warnings such as 'General Protection Fault'. In addition, those messages include the memory address where problems oc-



Several dozen new icons are included with Windows 3.1; many of them are accurate representations of the logos for DOS products. The Startup program group acts like a Windows version of DOS' AUTOEXEC.BAT

curred, as well as hints that help to explain the cause of the problem. The process of thoroughly debugging Windows will probably require active user participation, and it will be important to record these messages if they occur. There's nothing that users can do when they encounter one of these messages other than to record it and report the message back to Microsoft or the vendor of the problematic software.

Dr Watson on the case

To help keep that recording process going, Microsoft is including Dr Watson, a diagnostic utility. Dr Watson is not included in the default installation. To run it, type DRWATSON at the Program Manager's File Run command. Or, if you prefer, you can install Dr Watson to run from an icon.

Dr Watson works like a silent sentinel. You won't see it until a system error occurs. Then, after the Windows system error message appears, a Dr Watson dialogue box will pop up and ask you to describe what you were doing just before the error occurred. Dr Watson then saves your comments and a record of the machine's state. It won't eliminate bugs or memory conflicts, but this file can then be used to help Microsoft or a third-party software developer diagnose and remedy the problem.

Windows 3.1 is demonstrably more stable than Windows 3.0; actions that would induce UAEs in the older version no longer generate system-halting errors. But these errors occurred during testing with the early version of 3.1. When they occurred, we were usually able to store data and quit the system neatly. However, they occasionally resulted in a hung machine and data loss. These errors always occurred when we tested printing using TrueType, data-sharing using OLE and other new programs that weren't in final testing. Most

of these errors have been eliminated in the final shipping version.

Another protection against program conflicts is a further isolation of programs when running in 386 Enhanced mode. When you run into a problem, simply press Ctrl-Alt-Del; instead of rebooting, Windows 3.1 will let you shut down the active program and continue working with the rest of your Windows programs. It may not provide absolute protection against disasters, but it's a step in the right direction.

From pasting to object linking

The richest set of possibilities that opened up with this version will be found in an area guaranteed to create confusion: OLE. The idea behind OLE is to provide a software-independent format for data so it can be accessed by any Windows application, not only the one that created it.

This specification was advanced by Microsoft over a year ago and some Windows programs already support it, including Ami Pro 2.0 and Microsoft Excel 2.0. Some leading Windows programs, such as PageMaker, WordPerfect for Windows and Lotus 1-2-3 for Windows, still don't include it.

Windows 3.1 adds four of its own accessory programs — Write, Paintbrush, Cardfile and Sound Recorder — to the roster of OLE-compliant programs. And it adds Object Packager, a utility that can turn programs or embedded data into an object with unique properties.

OLE makes it possible for applications and their associated data to be accessed from other applications. By using the Paste or Paste Link commands, Windows automatically converts the data to one of the three formats known to Windows: metafiles, text files and bitmaps. In the OLE scheme, applications can either be clients or servers. Server applications are programs where linked or embedded data is created. Client applications are programs that receive OLE data that is linked or embedded, while Paintbrush and Sound Recorder are OLE servers, and Write and Cardfile are OLE clients.

When data is linked, it is stored in a separate file, but is accessible to both the server and client applications. You can make changes to the linked data through the server application, and the changes will be reflected in the client application. You can also make changes to the linked data by double-clicking on the object within the client application.

When data is embedded, it is stored within the client application and can only be accessed through that application. To edit the data, you must double-click on the object within the client application. If you don't want your document to be composed of many separate files, then you would

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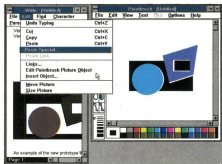


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The design in the Paintbrush window (at right) has been embedded in this Write document; the object has been highlighted so the colours are reversed. When you highlight embedded data in an OLE client application, the Edit menu displays a command that will let you return to the OLE server application so you can edit the embedded data

choose object embedding rather than linking.

For example, if you embed a .PCX graphics file into a Write document, you edit the graphics image by double-clicking on the embedded data. Paintbrush will then load. When you finish editing, simply close Paintbrush to get you back in Write.

Linking, embedding or pasting: your call

If editing the data in the object isn't important to the task, you can paste it as static data rather than linking or embedding it. In this case, double-clicking on the object will not trigger the server application.

Whether you want to link, embed or paste data objects, the process of moving data from one application that can act as an OLE server to a program that acts as an OLE client is very similar to a standard cut-and-paste. The difference is at the paste stage, when you must choose, through menu options, whether to link, embed or paste the data into the client application. When it works, OLE is a wonderful tool, but this early release is still plagued by rough edges and surprising twists of events.

The Object Packager

In addition to the four OLE-compliant accessory programs, Windows 3.1 also adds a utility that lets you turn almost anything into an object — even programs that don't have OLE features. Called Object Packager, it appears in the Accessories group. When you make a package out of embedded or linked data, you can treat it as a self-contained object with an icon and label of its own that can be inserted into OLE client applications.

In this form, objects are easier to work with; for example, if you've embedded a

spreadsheet range in a report, you probably don't need to see it all the time. It could be confusing to people working on the document, since they'll think the numbers in the spreadsheet can be edited the same way they edit the document. By turning the spreadsheet range into an object, with an icon of its own, you can make it clearer that double-clicking this data will cause a separate program to run.

Packaged objects can also include a command line. This lets you easily create a package that runs a DOS batch file from within a Windows program, or you could insert a Calculator icon into a Write document.

When you use the Object Packager, an application doesn't have to support OLE to act as a server. However, packaged objects can be inserted only into applications that support OLE.

More resources

The irritation of running low on system resources — the memory within Windows used to store information about a program's menu structure, dialogue boxes and so on — has been largely remedied. Some of the Windows code, such as the code found in Program Manager, is now more efficient in its use of resources. But overall, Microsoft didn't waste too much programming time trying to finesse this problem; it simply doubled the amount of RAM devoted to the resource pool from 64 to 128K. That should be enough to accommodate anyone running three or four programs, even if the programs are resource hogs.

In our tests, we found that on the same system, Windows 3.0 had 75 per cent of the system resources remaining at startup; Windows 3.1 had 85 per cent. After loading File Manager, Ami Pro 2.0 and Lotus 1-2-3 for Windows, Windows 3.0 only had 19 per cent of its system resources remaining; under Version 3.1, 57 per cent was still free.

Keeping tabs on both system resources

and available RAM is easier under Windows 3.1, too. When you choose the About box from the Help menu, all of the Windows accessories display the status of both resources and RAM.

Performance tuning

There are minor performance improvements of many tasks in Windows 3.1, though the gains may not be noticeable on 286 and 386SX systems. The improvements are partly a result of fine-tuning the internal code, partly because of a new 32-bit disk interface called FastDisk, and partly because of an overhaul of SMARTDrive, the disk cache.

We compared the speed results from our graphics-intensive tests of Windows 3.0 and 3.1, and they showed no change on most base-level functions. There was about a 40 per cent improvement in the common operation of opening a dialogue box, but most line-drawing and graphics movement operations performed about the same.

However, when we used the Compaq Super VGA drivers that come with Windows 3.1 and compared them to Windows 3.0 running the standard VGA drivers, we saw some graphics operations improve by 100 per cent and more. That could mean your system will perform better if you're able to take advantage of some of the new Super VGA drivers included with Windows 3.1.

It's still the responsibility of graphics board manufacturers to provide Microsoft with drivers, so the level of performance you'll receive is partially dependent on the quality of the drivers you can use. Fortunately, you can now change video drivers from within Windows using the Setup program, so it's easier to experiment with different drivers.

Many systems will be able to take advantage of this improvement. On our 25MHz Compaq 386 test system, Windows

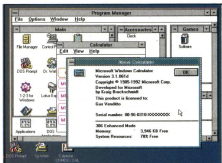
Windows

The five best aspects

1. TrueType fonts are handsome, simplify the print process and print quickly.
2. Object Packager is a powerful tool for embedding data or programs within OLE clients.
3. SMARTDrive is easier to use and faster than before.
4. A choice of fonts in DOS makes it possible to read small DOS windows.
5. The Sound Recorder lets you embed audio into OLE client data files.

The five worst aspects

1. There is still no File Copy command in Program Manager.
2. File Manager was completely overhauled but is still awkward.
3. There is still no Undelete command anywhere in Microsoft Windows.
4. There is not enough OLE. After proselytising OLE specs to other vendors, Microsoft should have made sure that Windows provided more OLE capability.
5. Windows still requires too much RAM.



The About box in all of the Microsoft Windows accessories, such as Write, Print Manager and Paintbrush, shows available memory and resources. Windows 3.1 doubled the amount of memory available for system resources

3.0 installed the standard VGA drivers. On that same system, Windows 3.1 automatically installed the Advanced Compaq VGA drivers, providing a 640 by 480 mode at 256 colours (instead of 16 colours) and faster performance.

There's no guarantee that you'll get this benefit just because you have a Super VGA board, however. When Windows 3.1 was installed on a system with an Orchid Pro

Designer with 1M of RAM, the standard VGA drivers were installed, but there was no improvement in performance.

The message is clear: if your Super VGA system is not able to take advantage of the video drivers that come with Version 3.1, make sure you ask the board's manufacturer for an upgrade. If one isn't yet available, experiment with one of the advanced drivers that comes with Windows 3.1 and see if you can get it to work.

Smarter SMARTDrive

Windows 3.1 comes with some internal improvements in disk handling. The most dramatic is a completely overhauled version of SMARTDrive (Version 4.0). It adds write-behind caching to the traditional read caching that was provided in SMARTDrive 3.06 (the version that shipped with Windows 3.0).

Read caching stores copies of data recently read from disk in memory, so that the next time you need it, a disk access isn't necessary. Since accessing a disk is so much slower than accessing RAM, this can vastly increase performance speed. Write-behind caching delays file-save operations for a few seconds so that you can move onto

other tasks without first waiting for a disk write. It can make a big improvement in the way your computer feels, since when you perform a file-save operation, you're usually ready to begin a new task. The addition of the write-behind cache lets your machine respond to your next request almost immediately; it performs the job of saving the file while you're probably occupied with something else.

The write-behind delay is not long. Data is, by default, written to disk at the first idle period and never delayed longer than five seconds. There are risks in using write-behind caching: if your system hangs, data can be lost. To protect against this possibility, SMARTDrive will attempt to intercept the system reset command and perform an immediate disk write before allowing the reset. During testing, however, data loss was encountered when a system error caused the machine to freeze before a file was saved.

Of course, some people will be uncomfortable with any level of delayed writing because of the danger (however remote) of losing data if an error causes the system to freeze. Recognising this, Microsoft has provided the option to turn off write-behind caching.

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But write-behind caching only accounts for part of the improvement that SMARTDrive 4.0 makes to disk performance. The new version of SMARTDrive is around four times faster than the earlier version on the DOS file access tests, which represent a full battery of disk operations. While the results of write tests showed the



The Control menu for DOS sessions lets you change the text's font size. It will automatically adjust the window size to make the best use of your choice of font size

biggest gain, the file creation times were two-and-a-half times better.

The improved file access times are not totally a result of the enhancements to SMARTDrive. Microsoft fine-tuned other file I/O operations as well — some of them dramatic enough to show up in stopwatch timings. On a 486/33, we compared program loading, ensuring that the cache wouldn't be a factor by making it the first thing we did after launching Windows. We found a saving of one second in loading File Manager, and as much as eight seconds in loading Lotus 1-2-3 for Windows.

Some of the disk-performance improvements come from a totally new approach to disk access. The disk-access technology is called Fastdrive, which cuts the amount of time Windows needs to switch from Real mode to Protected mode (which happens when you move in and out of DOS sessions from within Windows) by virtualising the disk controller's BIOS. The benefit appears only in 386 Enhanced mode. This strategy risks incompatibilities, but no problems were encountered in testing. Should you encounter a compatibility problem with Fastdrive, you can turn it off in Control Panel.

To increase the number of different drives with which it is compatible, SMARTDrive is now block-oriented. It hooks into DOS at the device driver level rather than BIOS INT13 and makes disk I/O requests through the DOS device driver. As a result, some disks that couldn't be cached before, including Bernoulli, SCSI and WORM drives, are cached by SMARTDrive 4.0. Because Version 4.0 is routed through the DOS device driver, utilities that write directly to the disk BIOS or require imme-

diate disk writes (such as CHKDSK), will have compatibility problems that will be left up to the vendor to resolve.

To ensure compatibility with devices that virtualise disk addresses — including bus-mastered controllers and some memory-management software — SMARTDrive can maintain a double buffer that holds both the physical and virtual disk addresses.

SMARTDrive attempts to make an intelligent installation, so if double-buffering is needed, it's automatically provided. On some systems, SMARTDrive will guess wrong and install the double-buffer setting even if it's not needed, resulting in a waste of 2 or 3K. The manual provides advice on how to check if double-buffering is really needed. If it's installed, there will be a double-buffer statement in your CONFIG.SYS file.

SMARTDrive will also cache floppy disk drives; you can turn off this option either at installation or from any DOS prompt. SMARTDrive 4.0 is an executable program, and you can run it at any DOS prompt to check on the status of each drive's cache.

Smoother DOS sessions

DOS sessions now run much more smoothly. Switching among sessions was faster, and we had no crashes in Windows 3.1 with DOS programs that once caused total system lockups. The faster, smoother switching in 386 Enhanced mode is mostly a result of Fastdrive, which cuts down on the need for processor mode changes.

Cutting and pasting was erratic in some DOS applications under Windows 3.0; for example, sometimes key presses didn't always work quite as expected. Those problems seem to be gone in Windows 3.1.

The best new feature for use with DOS applications is a dialogue box that lets you choose the size of characters in a DOS display. Choosing is easy, thanks to an intelligently designed see-it-as-you-pick-it display.

You can choose from 10 different character sizes that range from a low 4 by 6 pixels up to 16 by 8 pixels. As you highlight a choice, a preview display shows you the actual size of the characters and the size of the window that will be used for the DOS session. The OEM font for your video board is used for all sizes.

Communications under DOS are also likely to be smoother. At the time of testing, Microsoft was still in the process of enhancing COMM.DRV, but the most recent version had solved the problems of dropped characters that were seen in DOS windows during 9600 bits per second (bps) text transfers. On the same system where characters were dropped using Windows 3.0, none were dropped using Windows 3.1.

At this writing, Microsoft was still trying to improve the communication driver's support

for the 16550 UART. Windows communications programs can access the UART, but the driver was not yet able to virtualise the UART in DOS sessions. Because Windows 3.1 needs to virtualise the communications driver, DOS programs running under Windows could not use the 16550's FIFO buffer. Microsoft expects that it will distribute enhanced versions of the COMM.DRV file through its CompuServe forums and technical support within a few months.

Faster printing and recovery

Depending on the application and the type of job, Windows 3.0 could be very slow in printing. Microsoft's solution is TrueType, a new printing engine that uses its own scalable fonts for both onscreen display and printing.

You aren't forced to use TrueType; Windows 3.1 includes the bitmapped and vector fonts that never performed an adequate job of displaying onscreen what would be printed. If you prefer to use your printer's hardware fonts, Windows will still generate unrepresentative fonts onscreen from the same fonts it provided in the past. However, if you select any of the TrueType fonts, you'll find an almost flawless match between display and printed output. And through the Fonts setup dialogue box, you can organise it so that you only see TrueType fonts from menus. We didn't find any performance problems.

Short text-only documents will print almost immediately when you use TrueType, since only the characters used in the document are downloaded to the printer. You will also get your cursor back much faster, since the print-preparation work is immediately off-loaded to Print Manager. This is due to a change in the way Windows spools



TrueType fonts use the same scalable outlines when creating onscreen and printed characters

output for printing; it's now optimised for printing in the background.

Windows 3.1 comes with three complete TrueType font families: Arial (a Helvetica variant), Courier New and Times New Roman. All three come in regular,

bold, italic and bold italic. In addition, there are Wing Dings and Symbol fonts in one weight. You can add new TrueType fonts from the Control Panel. Microsoft's forums on CompuServe are likely to be distributing new families, and other font vendors have announced that they will be converting their libraries to the new format.

Microsoft officials claim that TrueType fonts can be rotated, though none of the software that comes with Windows can do it. TrueType fonts can be scaled to any point size (from 1 to over 500 points) and any weight, moving continuously from light to boldface. The software determines how much of its capabilities you can access.

But don't be fooled by the limited number of point sizes presented to you in an application's menu. For example, although the Write menu presents you with only 16 point sizes, you can actually type in any size you want.

TrueType on its own is an improvement that makes Windows 3.1 worth the upgrade. If you're a committed fan of Adobe Type Manager or Bitstream's FaceLift, there's little reason for you to change horses. But TrueType is a godsend for anyone who has not made a big investment

in fonts, or for people who have soft fonts that aren't represented by display fonts.

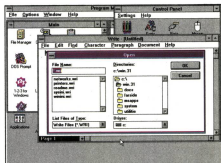
If you have a significant investment in soft fonts, you may want to use one of the newly introduced font converters that allow you to convert soft fonts to TrueType. Or find out if your fonts vendor has an upgrade offer for buying TrueType versions of the fonts.

Buried treasures

In addition to SMARTDrive, TrueType, OLE and the increased stability in system-halting errors, there's a treasure-trove of improvements sprinkled throughout Windows 3.1. Many of them are small changes that will seem like little gifts. Common dialogue boxes make file access simpler at almost every turn. New key combinations have been added for regular chores, and a host of customisation options have also been added.

Common dialogue boxes

Common dialogue boxes appear in all of the Windows accessories and within Program Manager, and expect them to appear in other applications as they're revised.



The File Open dialogue box is an example of what Microsoft calls common dialogue boxes: a basic design that is used for a wide variety of file-access commands

New designs are provided for file functions (open, save, import and so forth), font selection and printer setup. The dialogue boxes that provide file functions have drop-down lists for all drives, use file folder icons for subdirectories and have default settings for viewing only the data files recognised by this program.

The dialogue box is so well laid out that it helps to overcome Windows' file management problems. You still can't easily copy,

TrueType: the second font revolution for the desktop

Microsoft Windows 3.1 makes scalable fonts part of the operating system; your printer will never be the same. TrueType, Windows' new built-in font technology, offers superior output, speed and ease of use compared with add-on WYSIWYG font technologies, such as those in Adobe Type Manager and Bitstream's FaceLift.

TrueType won't supplant PostScript as the preferred font technology for high-end graphics design, and can't match PostScript's cross-platform compatibility (you can only use TrueType from the Windows and Macintosh environments). However, nothing else presently available on the desktop offers the speed and convenience of TrueType's screen and printer fonts.

Because TrueType is part of the operating system and not an add-on utility such as Adobe Type Manager, it renders fonts onscreen at top speed and works transparently with almost any application. Like Adobe Type Manager, you can choose any size you like; if the size isn't listed on your application's menu, just type the number into the Size box.

TrueType adapts itself to your printer in ways that no other font-scaling program attempts to do. If you use a Hewlett-Packard LaserJet, for example, Windows generates a PCL 4 font from a TrueType Scalable outline and downloads it to the printer; this method produces the fastest and most efficient output possible. By contrast, other font scalars, such as Adobe Type Manager and Bitstream's FaceLift for Windows, generate all characters as individual bitmaps. FaceLift for

WordPerfect downloads a PCL 4 outline.) You can still use these font-scaling add-ons with Windows 3.1, and if you upgrade to Adobe Type Manager 2.0, you can mix Adobe and FaceLift fonts with TrueType fonts.

If you use a PostScript printer, Windows sends TrueType fonts to the printer either as unhinted Type 1 PostScript font outlines or as bitmaps. The Type 1 outlines print faster than the bitmaps, but with lower quality at small sizes.

Windows 3.1 comes with 13 Monotype-designed TrueType fonts: four weights each of Times New Roman, Arial (a more graceful and lively variation of Helvetica), Courier New and a Symbol font. Each font looks sharper and smoother than Adobe's corresponding PostScript fonts, and produces better 300dpi output at smaller sizes than any other scalable font package on the market.

But the superb quality of these core fonts doesn't mean that other TrueType fonts will surpass their PostScript counterparts. Monotype devoted months to fine-tuning these 13 fonts. Fonts that other vendors rush to market — especially fonts hastily converted from other formats — may be much lower in quality. To gain TrueType's speed and convenience, you can convert PostScript and other fonts to TrueType format using programs such as Atach's AllType, but the quality of the converted font will be lower than the original because it's mathematically impossible to make an exact conversion from other formats to TrueType.

The Windows Control Panel lets you install additional TrueType fonts effortlessly, including a

48-font TrueType Font Pack from Microsoft. Unlike many other formats, TrueType only uses a single font file. Windows creates a font metric file when you install the font, but you don't have to copy it if you copy the font file.

TrueType isn't the only improvement in Windows 3.1's font handling. The new standard Windows character set adds 22 symbols to those in earlier versions, and you can use these characters with all font technologies, not just TrueType. Previously, Windows allowed you to choose bold or italic without indicating whether you actually had bold or italic fonts; if you didn't have them, Windows created crude equivalents. Now, Windows lets you choose fonts that really exist, and gives you easy access to fonts with attributes such as semi-bold and light.

If you have a large investment in PostScript Type 1 fonts, you won't be tempted to replace them with TrueType. Adobe Type Manager already gives you WYSIWYG screen fonts and printer fonts that you can use with any printer, although less efficiently than TrueType. PostScript also runs on more platforms than TrueType (and Adobe Type Manager is built into OS/2 the way TrueType is built into Windows) and has thousands of fonts already on the market. But TrueType makes scalable fonts instantly available to every Microsoft Windows user — effortlessly and quickly. PostScript began the first generation in desktop typography, and TrueType initiates the second.

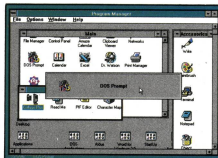
Edward Mendelson

move or delete a file in Windows without loading File Manager or shelling out to DOS, but the new file-access dialogue boxes move you closer to your files. The visual representation of the directory tree is a welcome relief from the older design where [...] was the most popular directory.

The file-function dialogue-box design is used by many programs for browsing among files. For example, the Program Manager's Properties command lets you use a dialogue box to Browse for executable files. The font dialogue box is a monumental improvement. As you select a font, size and style, you can see a sample. When you've selected a TrueType font, not only do you see a 'T' logo next to the font name, but the sample display includes a legend that tells you it's a TrueType font. When you choose one of the Windows bitmapped or vector fonts, another message pops up warning you that the displayed font may not match the printed output.

Smarter keys

One of the more attractive small touches is better use of shortcut keys. Previously, the Alt-Tab combination would switch between the two most recent programs. With



The Alt-Tab key combination makes it easier to switch among open programs, including DOS sessions. When you see the message board for the program you want, release Alt and the program will become active

Windows 3.1, this combination has been enhanced to make it easier to switch among open programs. To use it, hold down the Alt key and then tap on Tab repeatedly; with each new press of Tab, a message board pops up with the name and icon of one of the programs in memory, including DOS sessions. When you see the program you want, release Alt and that program becomes active.

The Alt-Enter combination was pre-

viously used to switch a DOS session between a window and full screen. Now, when your cursor resets on a program icon, Alt-Enter can also be used to edit the icon's properties.

You'll probably find yourself editing program item properties more frequently, since several dozen new icons are included. Many of them are accurate representations of the logos of DOS products. Program icons can also be more informative, since their text labels can take up to two or three lines. Long labels will wrap automatically, eliminating the problem of overlapping icon labels.

Controversial keys

One of the more controversial changes made in this upgrade is the addition of Macintosh-compatible cut-and-paste keys, which first appeared on PCs in Word for Windows 2.0. While Windows continue to work with the current set (Shift-Del for Cut, Ctrl-Ins for Copy and Shift-Ins for Paste), the Accessories in this version support a new set: Ctrl-X for Cut, Ctrl-C for Copy and Ctrl-V for Paste. The new shortcut keys are listed on the Edit menu, though you can use the old or new keys interchangeably. For example, you can

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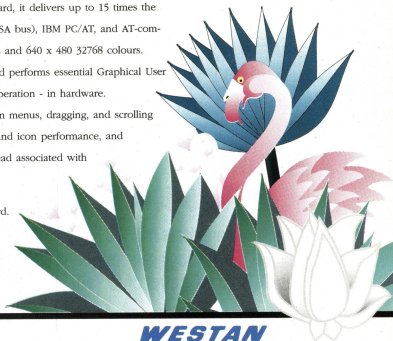
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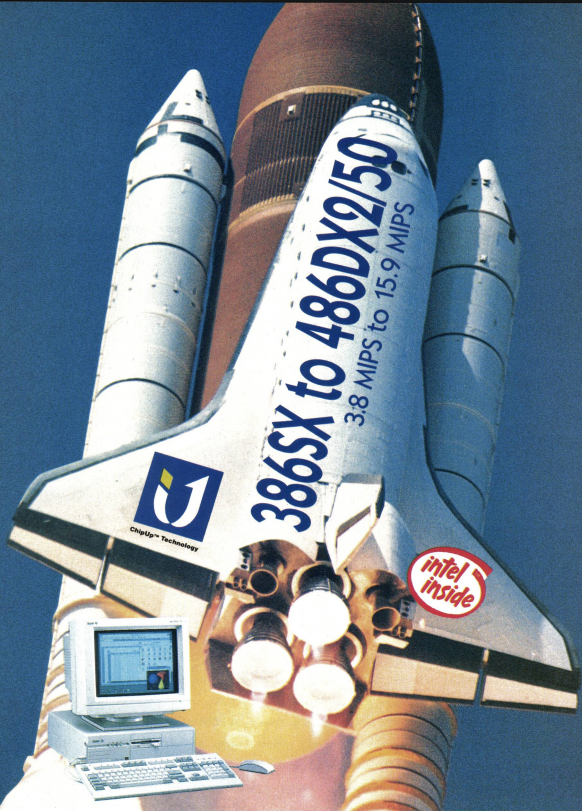
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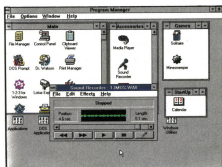
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The Sound Recorder can play, cut, mix and overdub audio files. Its interface is modelled on a tape recorder. In addition, Windows 3.1 comes with a Media Player, which is modelled on a CD player

cut a block of text by pressing Ctrl-X and then paste it using Shift-Ins.

The keyboard command changes are clearly there to help Microsoft turn Windows into a portable environment that will run in the same way, whether the underlying system uses a RISC or Intel processor, and whether it is made by IBM, Apple, Sun or a player to emerge later. The switch may take years to complete, since other Windows applications will have to be revised to fall in line with the new system. It will probably take your fingers a long time to make the adjustment, since you'll have to use the old shortcut keys in other Windows programs.

The start of something loud

One of the new accessories, Sound Recorder, provides more than one way to use OLE; it represents the official beginning of sound as a mainstream type of media on a PC.

You'll need some kind of sound card — ranging from a \$229 Sound Blaster to full-blown MIDI systems — to get the best use out of it, but you can play sound files using the Sound Recorder accessory and link them to Windows events even if your only audio device is your PC's built-in speaker.

In Windows 3.0, users were totally reliant on the Multimedia Extensions to furnish the hook into Windows' sound capabilities. Windows 3.1 incorporates most (but not all) of the full Multimedia Windows specification. If you buy a multimedia Windows device — a CD-ROM player, for example — you'll get the additional drivers (Multimedia Extensions). At press time, the only way to install the Multimedia Extensions for Windows was to add them to Windows 3.0 and then upgrade to Version 3.1. Microsoft has promised to serve up a better solution soon.

The PC speaker driver was not fully debugged by press time, so Microsoft is planning to make it available through its CompuServe forums and on request

through technical support. It was working in early versions, however, and although the PC speaker's quality is poor, it did a commendable job in playing the four .WAV files included. (.WAV is the Windows-supported waveform file format.)

With a Sound Blaster, Ad Lib or any other supported device, you can record sounds and then use cut-and-paste to insert the recording into an OLE client application. That means with only three shortcut key presses, you can link a recorded sound into a Write document. The recorded sound will appear in your document as an icon; double-clicking on the icon will launch the program that plays it.

Microsoft also added seven sound program calls to Windows 3.1 and, through a Control Panel option, you can link specific sound files to Windows operations. Among the Microsoft defaults are a trumpet-like 'ta-da' at Windows startup and a 'ding' to accompany error messages.

The Sound Recorder provides a very useful set of basic cutting and mixing commands. So, with a sound card and a microphone, you'll have a good start on a toolkit for recording your own musings or building a library of sound effects. The Sound Recorder's availability as an OLE server and the new sound program calls will probably make the workplace much livelier.

A better, but not yet perfect, File Manager

Microsoft has made significant improvements to File Manager. As a result of the improved disk performance and some significant code fixes, it loads much more quickly than in earlier versions. However, it still seems overly complicated and cumbersome.

While copying and moving are easy enough, you need to take too many steps for most other actions. For example, when you want to look for a file, you must first change your default directory to ensure that you're looking at a wide enough area of the disk. You don't often hunt for a file within a subdirectory; you search the entire disk.

And, as in the earlier version, some keys work differently depending on which part of the screen is active. For example, the right arrow key opens a subdirectory when your cursor is in the Directory Tree window, but when you're in the Directory Contents window, the right arrow key merely moves you to the file at right, even if the cursor is resting on a subdirectory.

File Manager is too dependent on menu commands and dialogue boxes; it could benefit from some icons. Here's one case where Microsoft would do well to look at other vendors' technologies. File Manager needs Smart Icons.

It's possible to become comfortable with File Manager in time, but the learning

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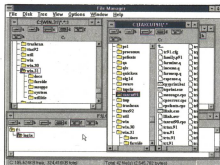
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File Manager runs faster and has more customisation options, but it's still a cumbersome tool to use for everyday disk-maintenance chores

curve seems too steep for a disk-management utility. The new File Manager makes The Norton Desktop for Windows look better than ever.

You may find yourself using it more often, however, to get the full benefit of OLE. When the data files are properly packaged, you have amazing customisation options from within File Manager. When data files are associated with programs, you get Macintosh-like drag-and-drop capabilities. A BMP graphics image dragged to a minimised Print Manager icon will be immediately printed using Paintbrush's printing control automatically. A sound file dragged to a minimised Sound Recorder icon will be immediately played.

File Manager has added a quick disk format command and lets you change the display fonts. (It still has no Undelete command.) One welcome new feature is that your previous settings are saved, including the directories last used, so if your file management work usually involves the same directories, File Manager will save time for you every time you load it.

A growing awareness of networks

When Windows 3.0 was introduced, there were numerous problems on NetWare networks. The problems disappeared when Novell upgraded the NetWare driver and shell. This time, Microsoft and Novell are working together to avoid a repetition of the problem. In addition to making sure upgrades will be available for leading network operating systems as soon as Windows 3.1 is released, there's significantly more help in the Windows manuals on installing and maintaining Windows on a network.

The exact options available depend on your network and the driver set that you're running. In the version we tested with NetWare, Control Panel's Network module provided settings for enabling or disabling network messages, controlling network

printer buffers, as well as an option for automatically reconnecting at Windows startup.

Smarter setup

Installing Windows has become a sideline for many people, whether it's in helping others or fine-tuning their own setup. If you're one of these people, you will find that the Setup program offers a big improvement.

There's a choice of customised and express installations. Customised installations let you keep the use of disk space to a minimum by choosing which non-essential programs are installed. The Express setup gives you everything, including all of the Accessories, help files and a tutorial designed for people who haven't even touched a mouse before.

Setup also gives you the option of creating an entirely new directory for Windows 3.1 and leaving your old version untouched. You may be tempted to take this option so that you can explore the new version before you decide if you want to keep it, but there's no reason to be so conservative. By installing it over the old version, you'll retain the settings you've put in place, such as wallpaper, program groups and opening screen positions. Further, Setup will delete many of the older files that are no longer needed.

When installed on a new system, the default Main and Accessories have approximately the same programs as before, with a few additions. The Games group consists of a largely unchanged Solitaire and a new game, Minesweeper, which is a 'pick the pegs' type game where you try to beat the clock. Reversi is gone, though if it's on your system and you choose the Setup option that upgrades over your existing Windows directory, it will stay in your games group.

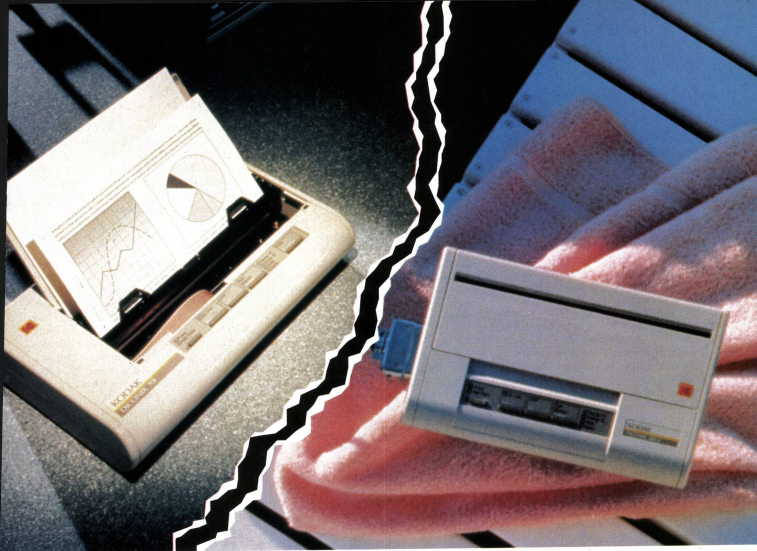
There will be less reason to tinker with your DOS configuration files, AUTOEXEC.BAT and CONFIG.SYS, after installation, since SMARTDrive 4.0 automatically allocates available memory. You can override the defaults with switches, but you may not need to.

Some things haven't changed... at least not much

Much has been left alone. PIF Editor, Notepad, SysEdit, Recorder, Calculator and Calendar are virtually all unchanged.

Cardfile is enhanced only by its ability to act as an OLE client. Write's font menu has been cleaned up and it can act as an OLE client. Clock has several new options, including a choice of fonts. Terminal is little changed, except for the sorely needed addition of new fonts.

The Help system has been improved overall with a more streamlined structure.



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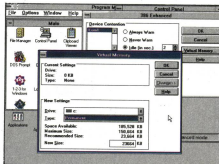
And the Help files available for individual programs often have clearer, more readable instructions. There's also an extensive use of hypertext-style help that lets you highlight an unfamiliar term to see a definition instantly.

A healthy Control Panel

Control Panel has a smorgasbord of new features, starting with the addition of new colour schemes. Four colour schemes for laptops are provided, including separate choices for LCD and gas-plasma screens. There are eight new screen areas that can be coloured, including button face and greyed-out text.

The 386 Enhanced mode options let you control the swap file, giving you control over its size and whether the file is permanent or temporary. Permanent files must be stored on contiguous areas on your hard disk and have the advantage of speed. However, they can't be installed on network drives. If you want to install your swap file on a network drive, you must choose the temporary-file option.

The Mouse options include the ability to add trails to make it easier to follow the mouse pointer on a laptop. When you use mouse trails, you'll see four or five mouse



Setting up a swap disk is much easier in Microsoft Windows 3.1, thanks to the Virtual Memory option in the Control Panel's 386 Enhanced mode

pointers whenever you move the mouse—an effect that helps overcome the slow refresh rates of LCD screens.

The Desktop module provides a choice of screen savers with password protection. Among the choices are a star field simulation and a marching marquee that can display a text message. There are a few new wallpaper choices, but nothing sensational. In fact, with the exception of a 256-colour shiny ball, all of the new wallpaper images are very conservative and require small amounts of RAM.

Why wait?

Microsoft began testing Windows 3.1 in June last year, using a large-scale beta program that was modelled after the one used to debug DOS 5.0. As a result, there's little reason to delay in upgrading. System-halting errors, or UAEs, are much less frequent, and any problems that still exist are likely to be solved by updating the offending programs, rather than by updating Windows.

The next enhancement to Windows will come from Windows NT, which is being designed to work across platforms and will require a 386 processor (see the text box 'Windows NT: the next big step for Windows' on page 126 of the OS/2 feature).

The basic story on Windows remains unchanged with this revision. You still need plenty of disk space and RAM, but Microsoft has looked at everything that people like about Windows and given us more of it. If you've felt that using Windows has been a struggle, your faith has been rewarded. ☺

Windows 3.1 costs \$225 and is available from Microsoft, tel (02) 870 2200.

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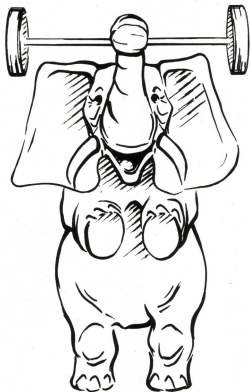
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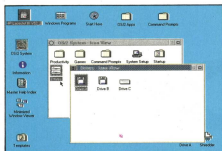
OS/2 2.0: does it fulfill the promise?



A 'better DOS than DOS', a 'better Windows than Windows' and a better operating system than the rest of them. Joe Salemi asks, will IBM regret the day it made these claims, or does OS/2 2.0 rise to the challenge?

It's become an industry joke that the next version of OS/2 will be the 'real one'. Well, the next version is here. Since our sneak preview in April, we have further examined OS/2 2.0 and found that it answered most but not all of the concerns that people have about the new operating system. The release has everything that was promised for OS/2 2.0 early on: multiple large DOS sessions, the ability to run Windows applications in a window on the OS/2 desktop, full-screen sessions and support for a wide range of systems.

In addition to OS/2 2.0 being a full multi-tasking, multiheaded operating system that relies heavily on 32-bit code, IBM has been claiming that OS/2 2.0 would be a 'better DOS than DOS' and a 'better Windows than Windows'. Judging from what we have seen, the 'better DOS than DOS' is here. The better 'Windows than



OS/2 2.0's main user interface is the Workplace Shell (WPS) Desktop, a completely icon-based interface that replaces the Presentation Manager from Version 1.x. The differences between the two are most obvious in the DRIVES application, which is the WPS replacement for the File Manager

Windows' may be an unreachable goal, but OS/2 2.0 is close to being a workable Windows environment. Equally important, OS/2 2.0 provides a new user interface through its Workplace Shell and a more object-oriented approach to file and application management.

Both an operating system and a GUI

People often talk about OS/2 2.0 and Windows 3.1 in the same breath, but it is important to remember that OS/2 2.0 is a new operating system as well as a new graphical user interface (GUI), while Windows is a GUI that runs on top of DOS. There are some important differences between the OS/2 operating system and DOS. OS/2 2.0 takes full advantage of the 32-bit and virtual-addressing capabilities of 386 and 486 chips, giving it many capabilities that DOS lacks. The most important of these is OS/2's bullet-proof memory protection, which prevents one application from bringing down your whole system.

But the cost of this operating system comes in heavy resource requirements. According to the documentation, OS/2 2.0 requires a minimum of a 386SX processor, 4M of RAM and a 60M hard disk. While OS/2 2.0 can run on the minimum configuration, we found that at least 6M of RAM enhances performance.

Another consequence of OS/2 being both an operating system and a GUI is that installing OS/2 is a bigger job than installing Windows. Our copy came on 21 1.44M floppy disks: 15 hold the operating system and GUI, and the remaining six contain printer and screen drivers. OS/2 2.0 installation is automated but tedious. The process takes 30 to 45 minutes, depending on the number of options you install, and it involves a lot of disk swapping. Installing

just the bare-bones system, without DOS or Windows support, occupies a minimum of 15M of disk space. Installing everything, including the system-trace and debugging programs, brings the requirements up to almost 30M. Realistically, OS/2 2.0 will eat up about 18 to 20M of disk space on an average system.

OS/2's new look: the Workplace Shell

The most obvious difference between OS/2 2.0 and previous versions is the new user interface: the Workplace Shell (WPS). The Presentation Manager (PM) Desktop interface used in Versions 1.1 to 1.3 bore a strong resemblance to Windows; everything was accessible through a series of grouped programs, and icon use was limited.

The WPS is highly iconised and object-oriented; it resembles the Macintosh's interface more than the other PC-based GUIs. For example, the name of an icon can be changed simply by clicking on it with the right mouse button while holding down the Alt key.

*•The improved memory management, coprocessor emulation and write caching all translate into a faster OS/2.**

WPS windows have more of a three-dimensional look than either Windows or Presentation Manager, particularly in the buttons on the drop-down menus and dialogue boxes. And the window frame is different: the System Menu bar in the upper-left corner has been replaced with a small representation of the icon assigned to the folder or application, and the sizing buttons in the upper-right corner are indicated with small and large squares instead of arrows. When an application is minimised, it can be either shrunk to an icon in a special folder on the Desktop or rendered invisible so that it does not clutter the screen. A pop-up Windows List replaces the Task Manager, and invisible applications can be made visible by clicking on them there.

The WPS also lets you set the colour schemes right down to individual windows, which is completely unlike the global colour settings in Windows or Presentation Manager. Since the default and optional colour schemes included are dull (to put it mildly), most users will want to create customised schemes for their own use.

OS/2 Desktop: the new order

Instead of the groups used by the PM Desktop and Windows, the WPS uses folders to represent collections of objects such as programs and data files. The primary folder (and the first one the user sees) is the Desktop, which serves as the root folder for all the others. A number of folders are created during installation, such as the OS/2 System folder, which holds all the system controls. Among the other folders created at this time are those containing the included applications or 'applettes' (more on these later) and the Information folder, which contains the on-line reference manuals for REXX (IBM's powerful batch programming language), the OS/2 commands and a tutorial. Other items on the Desktop are the icon for the Master Help Index, which has complete online help for OS/2, DOS and Windows, and a Start Here icon as a beginner's guide to basic functions. The Shredder icon is equivalent to the Macintosh trash can; dropping an object's icon on the Shredder deletes it from the disk.

If the installation process finds any pre-existing DOS or Windows applications on the hard disk, a Migration utility is run to let the user add the programs to DOS and Windows folders on the Desktop. The Migration utility can be run any time. New DOS or Windows applications are installed, since these will not automatically appear on the Desktop.

The last folder on the Desktop is the Templates folder. This folder is very important because the templates are used to add new objects, such as folders and applications, to the Desktop or other folders in the system.

You can create new objects by making a copy of the appropriate template in the place where you want the object to live and then filling out the various settings that describe the particular object: its screen settings (window versus full-screen, for example), associations with other data or program objects, and icon. Another new feature is shadowing; this gives the user the ability to have multiple icons in multiple folders that all refer to the same object. An icon editor is included so you can create your own icons if the program does not have its own or if you do not like the default.

An object-oriented design

Every object is configurable through its settings screens, which are accessed through the object's system menu. This powerful and flexible design allows the user to create associations between data files or other objects and applications. For example, you can create a folder of all data files that pertain to a particular project and then as-

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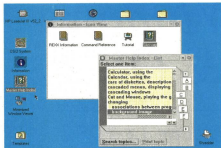
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Complete documentation is available online. Help is available through the Help option on each window or through the Master Help Index. Reference manuals for REXX and the OS/2 commands, as well as a tutorial, are accessed through the Information icon on the Desktop

sociate each data file with the application that created it. When you click on the data file, the appropriate application is launched and the file is loaded.

An additional settings screen is available for DOS and Windows programs that lets the user set more than 25 different parameters for a particular program's session. Among other settings, these parameters control the amounts of conventional, LIM EMS and XMS (extended memory specification) memory available to the application, whether the application should have exclusive control over the mouse, and whether it needs DPMI (DOS protected-mode interface) services. You do not have to remember where a particular program or data file is on the hard disk when using the settings screens. You can browse the disk and then click on the filename when you find it; the filename will be automatically entered in the settings screen.

Improvements in Version 2.0

OS/2 2.0's use of virtual memory is much more efficient than that of OS/2 1.x, mainly because Version 2.0 uses the 386's ability to swap out a 4K page at a time, instead of the full 64K segment that the 286 required. The SWAPPER.DAT file (where the pages are swapped) is also dynamic; the file grows and shrinks as needed, instead of constantly growing as it did in previous versions. For systems without a numeric coprocessor, OS/2 2.0 will install an emulator.

OS/2 has two hard disk caches: one for file allocation table (FAT) disks and one for High Performance File System (HPFS) disks. The HPFS has had write caching (lazy writes) in addition to read caching since the introduction of HPFS with OS/2 1.2. Now the FAT cache, which is built into the operating system, also has optional lazy-write capability. The improved memory management, coprocessor emulation and write caching all translate into a faster OS/2.

OS/2 2.0 continues the built-in support for Adobe Type Manager fonts that started with OS/2 1.3. IBM has not made any official statements on TrueType support at press time. In addition, the ability to set the font size in OS/2 windows running text applications has been extended to include DOS windows.

The online reference manuals found in earlier versions of OS/2 are still present. As before, these contain complete OS/2 documentation from settings to commands.

SCSI (small computer system interface) support has also been improved. Earlier versions of OS/2 required owners of SCSI drives to get the correct drivers from their card vendor. The SCSI drivers in OS/2 2.0 are designed to be generic and will work with virtually all SCSI drives. CD-ROM support and explicit support for Adaptec and Future Domain SCSI Devices have also been added.

The File Manager in OS/2 1.x has been replaced with the Drives icon. The Drives icons treat each disk as an object and let you manipulate the contents of the disk directly in its own window without having to load one master application and switch from disk to disk. As individual directories and files are also treated as objects, each can be copied or moved between different disks and folders by dragging its icon to the destination. Dragging a file's icon to the Shredder deletes it; dragging it to the Printer icon prints it. Finally, network support is improved through the internal LAN route. LAN drivers register themselves with the internal router, which provides seamless integration of LAN resources with local resources on the WPS Desktop.

But wait, there's more!

Taking a cue from Microsoft Windows, IBM has included a number of small applications (or 'applettes'), and games with OS/2 2.0, which are installed in the Productivity and Games folders in the main OS/2 System folder. Besides versions of Klondike Solitaire and Reversi, there is a jigsaw puzzle that uses OS/2 bitmaps, a scrambled-number game and a version of chess for one or two players (two players can even play across a network).

The Productivity applettes cover a wide range of functions. Chief among these are a simple Terminal program similar to the Windows Terminal; Pulse, which monitors system activity with a constantly updated graph; and PM Chart, a version of Micrograf's charting program that lets the user create various charts and drawings. Also included are the Icon Editor, which lets you modify existing icons or create new ones; System Editor, which is equivalent to MS-DOS 5.0's Edit utility; Enhanced Editor, a mini word processor; Picture Viewer,

which lets you view, print and convert OS/2 bitmaps and metafiles; and File Search/Find, which lets you search for files across multiple hard disks.

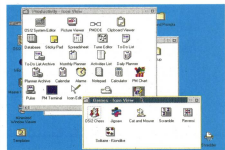
The rest of the applettes consist of what used to be an internal IBM application called PM Diary that 'escaped' to a number of BBBS in its OS/2 1.2 version. These applettes include a calendar, a meeting planner, an alarm (a pop-up that will tell you when it's time for a meeting), a to-do list, a calculator and a notepad. There is also a mini spreadsheet with 80 columns by 26 rows, and a small database system that is similar to the Windows Cardfile and useful for keeping limited lists such as an address book.

A better DOS than DOS?

OS/2 2.0 support for DOS applications is excellent. Each DOS session can access up to 640K of conventional RAM, with almost 620K available at the DOS prompt. This can be increased to 640K by changing the DOS setting to load the DOS kernel into high memory. Support is included for the upper memory block (UMB) functions of DOS 5.0, so TSRs can be loaded into high memory in each DOS session by using the LOADHIGH function. DOS sessions can be switched between full-screen and windows on the Desktop with the Alt-Home key combination.

Each DOS session can theoretically access up to 32M of EMS memory and 16M of XMS memory. As an experiment, we changed the settings in a plain DOS window to reflect the maximum and also loaded the DOS kernel into high memory. Both the DOS MEM utility and the Mapmem utility reported 640K of conventional RAM, 11M of EMS and 10M of XMS memory available—on a 20MHz 386 with only 8M of real memory!

This is possible because the OS/2 operating system uses virtual memory to the fullest. Swapping to disk slows things down a little, but the swapping algorithm



OS/2 2.0 ships with a number of games and productivity applications, including a communications program, charting program, system monitor, small database and spreadsheet

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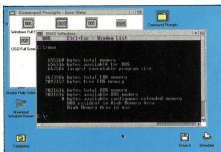
in OS/2 is intelligent: it only swaps what it recognises as data. The swapping algorithm does not bother to swap out executable code because it knows it can just reload the code from the disk from where it originally came. The algorithm is also smart enough to allocate memory on the fly; even when it says there is 10M, it does not actually use 10M until that amount is needed.

As an informal performance test, we tried using a word processor in one DOS window while running communications software in another DOS window as a background process. After tweaking the settings (for example, adjusting the amount of memory assigned to each window), there was virtually no perceptible slowdown in execution speed, and switching between the two programs was quick and smooth.

Support is also provided for DPMS applications such as Lotus 1-2-3 Version 3.1; a configuration parameter controls the amount of DPMS memory available to the application. The only DOS applications not supported are those that use the VCP (virtual control program interface), a method for running in DOS protected mode that preceded DPMS.

Most DOS device drivers are supported. A driver can be loaded in the individual sessions by simply entering the driver path and name in the settings screen. Or, if the driver needs to be accessed by every DOS session, it can be included in the CONFIG.SYS file.

DOS compatibility was given very high priority in OS/2 2.0, and this version comes with a DOS 5.0 emulator. But if you want to run DR DOS, if you are running a DOS program that requires a different version of DOS, if you need a device driver that cannot run under the emulator, or if you have any other compatibility problems, you can easily boot the real thing in a DOS window. Just add the boot path to the settings screen. And you do not have to boot from a floppy disk; the path can point to an image file on your hard disk.



OS/2 2.0 supports multiple DOS sessions; each DOS session provides conventional RAM, LIM EMS and XMS memory. Users can adjust the available amounts of each type of memory

A better Windows than Windows?

You can run multiple full-screen windows sessions, each in its own virtual machine, and also run Windows applications in a window on the WPS Desktop. But the version we looked at was limited to running Windows in an OS/2 windows at VGA resolution. There are also extra steps involved in installing Windows applications because they do not automatically appear on the Desktop.

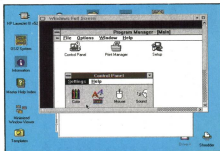
Windows applications can only run in Real and Standard modes and support for Enhanced mode is not planned for the final release. This is not as significant a limitation as it sounds, since one of the biggest advantages of running Windows in 386 Enhanced mode is the ability to multitask DOS applications — an ability already present in OS/2 2.0. The other reason to support Enhanced mode, however, is to run Windows programs that use 32-bit addressing, such as Mathematica. Most Windows programs that use 32-bit addressing do so through WINMEM32.DLL (as recommended by Microsoft), and OS/2 does not support WINMEM32.DLL.

Each Windows session has a limited Program Manager, with a Control Panel and Clipboard. Windows programs are installed under OS/2 2.0 the same way they are normally installed. You open a Windows window and then use the Run command or you install it from the DOS prompt — whatever the program requires.

OS/2 2.0 also supports Dynamic Data Exchange (DDE) and Object Linking and Embedding (OLE) between Windows applications. In addition, every Windows session has an icon for the data interchange driver, which creates DDE links between OS/2 and Windows programs. OLE between OS/2 and Windows has been announced for a version of OS/2 due for release later this year, although there were still some bugs in the OLE implementation in the version we looked at. The DDE support is provided through the PMDDE utility.

OS/2 2.0 is especially good at multitasking because it protects each application's allocated memory from the other applications running. A crash in a DOS or Windows window will not cause the whole system to crash. OS/2 will shut down any application trying to access memory belonging to another application and then alert the user to a protection violation. But OS/2 itself and the applications in the other windows will continue to run without incident.

This exceptional stability is due to the fact that OS/2 is a protected-mode operating system, not a GUI running on top of a real-mode operating system such as DOS.



Windows 3.0 applications run in a full-screen session or in a window running on the OS/2 PM Desktop under OS/2 2.0. But Windows in a window is limited to VGA resolution at this time

The memory used by each application is guaranteed to be independent of the others; OS/2 prevents an application from accessing memory that the application does not own. This protection against memory-access conflicts makes OS/2 well suited for networked database applications. OS/2's relatively crash-free design also recommends it for mission-critical applications such as billing systems.

We tried to test OS/2's protection capabilities by deliberately inducing a UAE (Unrecoverable Application Error) in a Windows window. But our attempt failed completely with all the Windows applications on the test system, including some that will crash when running under Windows 3.0. This is testimony to OS/2 2.0's stability.

The learning curve

The Workplace Shell is sufficiently different from existing PC-based GUIs that it will require some relearning. Its object-oriented approach forces the user to think about things differently. Macintosh users and those coming to a PC-based GUI for the first time may have an easier time adapting to the WPS than users already accustomed to Windows or Presentation Manager.

At first, we found the WPS very confusing, particularly in the way the mouse works. Like Windows or Presentation Manager, the WPS uses left mouse button clicks to launch applications, bring a window to the foreground on the desktop or pull down a menu. But dragging an icon to move or shred a file is done with the right mouse button (or middle button on a three-button mouse). The right mouse button can also be clicked anywhere on an icon or window to bring up the system menu for that application. Holding both buttons down at the same time brings up the Window List, which replaces the Task Manager and offers an alternative way of moving between applications. But after using the WPS for a couple of days, the whole system

became more intuitive and easier to use. (The text box 'A guided tour of the Workplace Shell' provides a step-by-step example of using the WPS.)

The online documentation is a big help in becoming familiar with the WPS. In addition, the manual includes a section on setting up the WPS to resemble the Presentation Manager interface while learning the new system. (According to IBM officials, this may be an automated option in a future release.) But you should probably take the time to get a feel for how the WPS is designed to work. IBM has been criticised for introducing a new GUI approach this late in the game, but the Workplace Shell is worth learning and using.

What's missing?

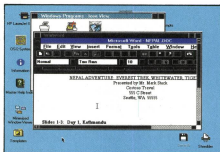
IBM has announced that it will support Windows 3.1 applications in an update to OS/2 2.0 soon after the release of Windows 3.1.

One feature that Windows 3.1 supports that is lacking in OS/2 2.0 is the Ctrl-Alt-Del trap for DOS applications. In Windows 3.1, this combination lets you either close only the offending application or reboot your computer. But under OS/2, pressing the reboot keys anywhere in the system, even in a DOS or Windows full-screen session, reboots your computer. This can be a problem: data can be lost and files from background applications can be trashed when the normal OS/2 shutdown procedure is bypassed. This is partially counterbalanced by the fact that a locked-up DOS application usually does not lock up the whole system due to OS/2's native memory protection mechanism; the user can just switch back to the Desktop and close the errant application from there.

Also missing from this release is support for 32-bit Windows applications that use WINMEM32.DLL. Virtually all Windows applications that use 32-bit addressing use WINMEM32.DLL, the method provided by Microsoft; these programs only run in Enhanced mode, which OS/2 2.0 will not support.

Programs that use direct disk sector addressing, such as Norton's UnErase utility, cannot be run in an OS/2 DOS session. But OS/2 provides a mirroring capability (similar to that in DOS 5.0) that moves a deleted file to a hidden place on the disk, where it can later be recalled or purged. And there are third-party utilities that support undeleting files on HPFS partitions. This capability can be turned off if you do not want to spend the disk space needed to run it.

The full 32-bit graphics engines promised for Version 2.0 exist, but won't be available until the third quarter.



Getting a Windows application to run on the OS/2 Desktop requires only slightly more work than in Windows. Each Windows application has a limited version of the Program Manager, including a version of the Windows Control Panel that controls the appearance of OS/2's Windows sessions

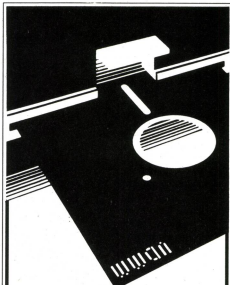
Network support for Novell's NetWare, IBM's LAN Server and Microsoft's LAN Manager was in beta testing at press time, but was not part of the version we tested. Network support should be available shortly.

Installing OS/2

Normally we do not dwell on the details of software installation, but because OS/2 is a new operating system, installation is a major undertaking and the story is worth telling. As we went to press, there were still minor bugs in the installation program.

The first portion of the installation process uses a character-mode interface. The user is given a number of options, such as whether to format the hard disk and what type of mouse to attach to the system. After the core system files are installed, the PC reboots and switches to a graphical interface. At this point, the user can change any of the basic system information (type of mouse or keyboard, for example) and then choose which type of system to install: minimum, full or user-selected.

The user-selected installation option is the most flexible choice, letting you choose which features to install and which to leave out. A counter in the lower right-hand corner of the screen keeps a running tally of available disk space and the amount of disk space needed by the chosen options. Note that disk space must also be kept free for the virtual memory swap file, which can range from 1 to 12M in size, depending on system memory and the number of applications open. Swap file space requirements are not reflected in the counter of needed disk space. It is important to keep an eye on the counter. The installation program will not prevent you from trying to install more than you have room for; it will merely continue installing the options until the process crashes. Depending on where it



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A guided tour of the Workplace Shell

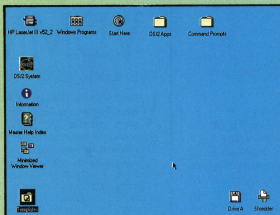
BY JOE SALEMI

There are a number of fundamental differences between the way the Workplace Shell (WPS) in OS/2 2.0 works and the way the GUIs in OS/2 1.x or Windows 3.x work. Most important, the WPS is object-oriented. Almost everything is treated as an object, including icons, folders, applications and files. As part of the object-oriented design, the left and right mouse buttons are used to control different functions.

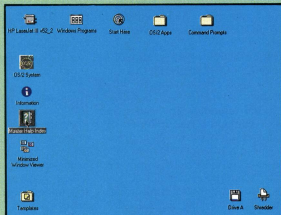
The right mouse button (or the centre button on a three-button mouse) is used to pop up an object's System

Menu, which describes its attributes. Using the right mouse button may be confusing at first if you are used to Windows or Presentation Manager.

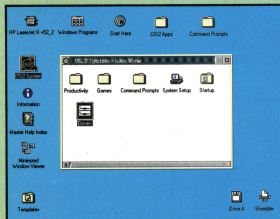
As the saying goes, a picture is worth a thousand words. So here, in screenshots and a few words, is a tour of the WPS, paying close attention to mouse use. In the explanations that follow, clicking the mouse button means pressing and releasing the button once and double-clicking means clicking the button twice in succession.



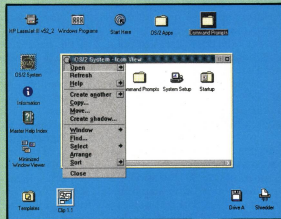
The initial WPS display, called the Desktop, consists of a mostly blank screen with icons representing the Print Spooler, Shredder and various folders. Users can arrange the icons in whatever pattern they prefer



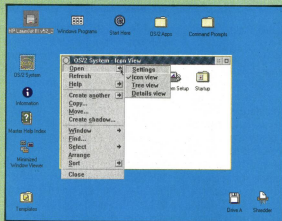
Clicking on an icon with the left mouse button highlights the icon for further action, as seen here with the Master Index icon near the left centre of the screen



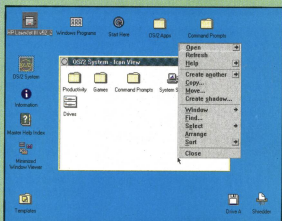
Double-clicking on an icon with the left mouse button opens the object that the icon represents into a window (here, the OS/2 System folder is being opened). Note the small representation of the object's icon in the upper-left corner, where the system bar normally appears in a Presentation Manager or Windows 3.x window



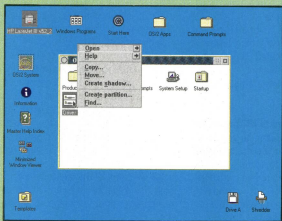
Clicking with the left mouse button on the system icon in the upper-left corner of the window brings up the System Menu for the object in that window. The items on the menu vary according to the type of object in the window and the actions that can be taken on that object



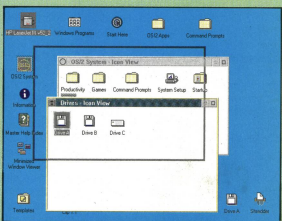
Clicking on the arrow button in the menu with the left mouse button brings up the submenu for that item



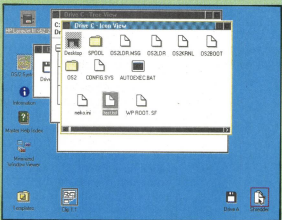
Clicking in the window of an object with the right mouse button brings up the System Menu for that object



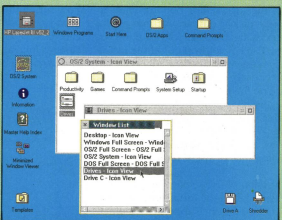
Clicking with the right mouse button on an object's icon brings up that object's System Menu without having to open the object



Putting the mouse pointer on a window's title bar and holding down either mouse button lets you move the window around. Placing the pointer on any of the edges and holding down either button lets you size the window



Putting the mouse pointer on an object's icon and holding down the right button lets you drag the object to another location. Releasing the mouse button drops the icon in the new location. Here, the icon for the file Test.txt is being dragged to the Shredder icon. When the icon is dropped, the file will be deleted from the hard disk after you receive a confirmation message



Clicking both mouse buttons together anywhere on the Desktop, including inside open windows, brings up the Windows List. This is the replacement for the OS/2 1.x Task Manager (equivalent to the Windows 3.x Task List) and lists all the currently open objects. Clicking on the name of any item in the Windows List brings that object to the foreground

Debunking the myths of OS/2

Myth 1: You have to reformat your hard disk to install OS/2 This is only true if you decide you want to use the High Performance File System (HPFS) introduced with OS/2 1.2. And with HPFS, users have always had the capability to partition only part of the hard disk as an HPFS; the rest is left as a file allocation table (FAT) and thus available from normal DOS. Versions 1.0 to 2.0 of OS/2 have supported the standard DOS file system for backward compatibility, and it has always been possible to install and use OS/2 on a pre-existing FAT system without losing any files.

Myth 2: OS/2's system requirements are excessive This seemed true in 1987 when OS/2 1.0 was released and required at least a 286 with 3M of RAM, but the changes since then have been minimal: OS/2 2.0 requires a 386 or better with 4M of RAM. What seemed excessive five years ago is now considered a normal Windows 3.x system; current Windows users can upgrade to OS/2 without having to make any hardware upgrades.

Still excessive are OS/2's hard disk requirements: the bare minimum for OS/2 2.0 is around 15M of disk space, and loading the full system can eat up 30M. But consider that in about 18M of disk space you get a full 32-bit multitasking operating system, the equivalent of MS-DOS 5.0 and Windows 3.0, and complete online documentation for all three. In that light, the requirements, while still high, do not seem excessive after all. A 386SX with 4M of RAM and

a 60M hard disk is an acceptable minimum system for OS/2 2.0.

Myth 3: OS/2 is incompatible with existing DOS applications This is partially true under the 1.x versions. OS/2 1.x is limited to only one DOS session at a time and generally does not run any DOS applications that require device drivers loaded through CONFIG.SYS or any applications that need expanded or extended memory. OS/2 2.0 uses the memory management of the 386 chip to bypass this issue: EMS (expanded memory specification), XMS (extended memory specification) and DPMI (DOS protected-mode interface) are completely supported for DOS applications, and individual drivers can be custom-loaded into particular DOS sessions as needed. Many drivers can even be loaded through the OS/2 CONFIG.SYS, so they are available to all DOS sessions. Finally, the ability to boot different versions of DOS from either the hard disk or a floppy disk completely eliminated 99 per cent of the incompatibilities that remain—only VCPi (virtual control program interface) applications are not supported.

Myth 4: OS/2 is proprietary to IBM and IBM PS/2s The second part of this myth was never true, as all 1.x versions of OS/2 were supported on IBM's AT systems. Three factors probably caused the confusion that led to this myth. First, many users mistakenly linked OS/2 with the PS/2 system because the names are similar; this connection has not yet been erased from users'

minds. Second, OS/2 can take advantage of BIOS, the protected-mode BIOS that PS/2 uses. Many users thought this meant that OS/2 required a proprietary BIOS, but the vendor was only taking advantage of the special features existing in its systems. Third, the early versions of OS/2 required special drivers from the manufacturers of PC clones to work with many of the non-standard system components (such as SCSI drives); IBM's version did not work out of the box on many clones.

As of January 1992, IBM committed to having OS/2 2.0 work on as many different systems as possible; the company has published a constantly updated list of systems on which OS/2 2.0 has been tested. OS/2 2.0 also works on many systems not yet tested by IBM. Of course, 'working with' is different from 'supported on'. Support now exists for just about all the major clone systems in the marketplace (but it is still not clear who will provide the support).

Myth 5: OS/2 is always late This one depends on how you look at it. IBM announces its plans well in advance (perhaps too far), and IBM has never waited until the last moment to announce if it will not meet a ship date. When a date is pushed back, it happens months before the product was supposed to ship, which gives IBM's clients enough time to revise their plans. IBM has never simply missed an announced ship date, but, then again, neither has any other vendor that reserves the right to change an announced ship date.

crashes, the system could be rendered inoperative and you would have to start the whole thing again after booting with an emergency disk. You can use one of the first two installation disks for this purpose, using the Esc key to drop out of the installation process into a character mode of OS/2 so you can delete files from the disk.

If you do not have enough disk space to install everything you want, you can install just the basic operating system to get up and running. You can later delete files to make space on the disk and then run the selective install program to install the options you want.

If a version of DOS 3.x or later is found on the disk during the installation process, OS/2 2.0's dual-boot support is automatically activated. This is identical to the one provided in OS/2 1.3, where the BOOT program is run with the '/DOS' or '/OS2' command-line option to swap the appropriate files around and reboot the system into the other operating system. In order for dual-boot to work, the primary (C:) partition has to be in the traditional DOS file allocation table (FAT) format so DOS can see and boot from it.

OS/2 2.0 also provides another multiple-boot option, the Boot Manager, which lets you run multiple operating systems in separate partitions on your hard disk. You can have DOS, OS/2 and AIX (IBM's version of Unix) all installed on your hard disk, and choose which operating system to run

What remains to be seen is whether IBM can effectively market the product, especially in the light of the Windows 3.1 announcement.

when the system is rebooted. The Boot Manager itself lives in a 1M partition on the primary boot disk; the requirements for the other partitions vary according to the size of the operating system being installed. On

the positive side, you can use the Boot Manager to run DOS 3.3, DOS 5.0, OS/2 1.3 and OS/2 2.0 on the same system, for example. On the negative side, other operating systems' primary partitions are invisible to the active one, which restricts what you can move from one to the other. The Boot Manager also requires that you reformat your hard disk, so you would have to back up all your existing data before installing it.

At the end of the installation process, a list of printer drivers is presented and one or more drivers can be installed. The number of supported printers was a problem in older versions of OS/2, though it increased with each release. In OS/2 2.0, there are over 200 printer drivers, supporting almost every major laser and dot matrix printer. Finally, the user is given the option of migrating DOS and Windows applications. If you choose to do this, the installation program will search your hard disk for existing applications and add them to either a DOS or a Windows folder on the desktop.

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Windows NT: the next big step for Windows

The most puzzling question raised by Windows NT is, Why do we need yet another operating system when things are confused enough as they are?

Well, when the idea for NT was born, the landscape was very different.

Windows NT (for 'new technology') is the current name for the new portable 32-bit operating system from Microsoft. For its primary application environment, Windows NT will feature an enhanced 32-bit version of Windows. Like Unix, Windows NT has been designed to be portable; the first versions will run on 386 and 486 machines, as well as DEC workstations based on the MIPS R3000 and R4000 chips. Beta versions of Windows NT have gone in limited distribution to developers and Microsoft is predicting the retail release by the end of the year.

Shifting focus

The Windows NT project began at Microsoft about three years ago under the direction of Dave Cutler, a key designer of VMS (Virtual Memory System) at Digital Equipment Corp. Windows NT was originally intended to be OS/2 3.0: a 32-bit version of OS/2 that could be ported fairly easily to other microprocessors, particularly RISC machines and multiprocessor boxes. This involved redesigning the kernel and writing it in C rather than assembly language, as well as porting the OS/2 Presentation Manager to a 32-bit environment.

During the fourth quarter of 1990, the Windows NT project changed direction. OS/2 sales were going nowhere and Windows 3.0 sales were going through the roof. IBM and Microsoft split company; IBM took over OS/2 2.0 but left OS/2 3.0 in Microsoft's hands. Soon after, Microsoft abandoned Presentation Manager and decided to put a 32-bit version of Windows into Windows NT instead. What had been called at various times 'OS/2 3.0' and 'NT-OS/2' then became known as 'Windows NT'.

As it stands now, Windows NT will feature a full 32-bit kernel that can handle multiple processors and pre-emptive multitasking. Unlike the co-operative non-pre-emptive multitasking found in Windows today, Windows NT will not allow one program to hold up the system. Although the primary application environment will be a 32-bit version of Windows, Windows NT will also run existing 16-bit Windows programs and DOS programs. Windows NT is designed to conform to the POSIX standard (a form of Unix often required for government contracts) and meet government security ratings. Some OS/2 compatibility may

also be in Windows NT, although the extent of this seems to change with the winds.

The Win32 API

Windows NT is the first implementation of what Microsoft dubs Windows 32. Win32 is not a product itself but a specification for an application programming interface (API). Win32 is a lot like Win16 (the current Windows API) but expanded to 32 bits with some enhancements.

The most notable enhancement is full pre-emptive multitasking and multithreading. As with OS/2 programs, Windows NT programs can split themselves into several threads of execution that run simultaneously. Win32 also redefines the internal Windows keyboard and mouse input model to be asynchronous among applications. This means that a Windows NT program can receive keyboard and mouse input while another program is still processing earlier user input. No Windows NT program can hang the rest of the system.

The Windows Graphics Device Interface (GDI) is also being significantly improved. Many of the graphics features that made the OS/2 Graphics Programming Interface (GPI) so wonderful — including the graphics rotation made possible by matrix transforms, the complex curves made possible by Bézier splines, and useful tricks with lines and areas made possible with PostScript-type paths — are all part of Win32, as well as support for halftones and device-independent colour. These enhancements bring the Win32 GDI nearly up to the graphical standards established by GPI.

At some point, the Win32 API will also find its way into a DOS-based version of Windows, but this is not expected until 1993. This DOS-based version of Windows will require a 386 or 486 and will feature the entire Win32 API (including multithreading) with the exception of some government security requirements.

The ability to continue to run a Win32 version of Windows on top of DOS is good news for DOS and Windows users who are not yet ready to make the leap to a new operating system. The good news for developers is that Windows NT executables are intended to run without modification under this DOS version of Windows.

Making the big switch

Windows NT illustrates the lessons Microsoft has learned from the problems with OS/2. While it is occasionally reasonable to ask programmers to make big leaps — such as the leap from DOS

character-mode programming to Windows graphical programming — you can't come back a couple years later and ask them to migrate their Windows code to the significantly different OS/2 Presentation Manager.

Many software vendors and corporate programmers had to choose between developing for Windows and developing for Presentation Manager. The larger installed base for Windows made the choice obvious, resulting in few available Presentation Manager applications (and, therefore, fewer reasons for users to buy it).

Clean breaks are great in theory, but this industry has become so large that it often moves slowly and cautiously. What we now value are continuity, consistency and compatibility. Developers have invested much time and energy in creating Windows applications. To preserve this investment, Windows must have a clear future growth path, and that (in part) is Windows NT.

Unlike the OS/2 Presentation Manager, Win32 is a straightforward extension of the current Windows API. Although translating a 16-bit Windows program to a 32-bit Windows program will not be quite as easy as translating a 16-bit Presentation Manager program to a 32-bit Presentation Manager program, it will be much easier than converting a 16-bit Windows program into a 16-bit or 32-bit Presentation Manager program.

And because Windows NT features Windows as its application environment, getting Windows NT to run existing 16-bit Windows programs should also be easier, cleaner, more compatible and more efficient at getting Presentation Manager to run them.

Will Windows NT fly?

As two graphics-based 32-bit operating systems, Windows NT and OS/2 2.0 stand face-to-face in the market. On the one hand, Windows NT will have to catch up with OS/2's maturity and its growing (but belated) acceptance among users. On the other hand, the support of a 32-bit Windows API in Windows NT should give developers much less grief than Presentation Manager and thus prompt the early availability of Windows NT applications.

Because of its portability to non-Intel architectures, Windows NT could also be a formidable competitor to Unix. The Windows NT and Unix sideshow may prove very interesting.

The most intriguing question of all may be whether Windows NT or anything else can dislodge DOS from its long-standing reign on the desktop.

Charles Petzold

over the FAT system have been well documented. The directory structure of the HPFS is faster and better organised. With the HPFS, sectors are used to store files instead of clusters, so storage is more efficient. And

HPFS filenames can be up to 255 characters long.

HPFS disks cannot be seen or used when DOS is the primary operating system, however. And DOS sessions under OS/2 are

limited to seeing only the files whose names are in the FAT-style eight-plus-three-character format, whether FAT or HPFS is used. Also, you cannot use the dual-boot function if the primary partition is HPFS, as DOS can-

The five best aspects

1. OS/2 2.0 is a true 32-bit operating system.
2. A fully implemented protect mode makes OS/2 2.0 very stable.
3. Multiple DOS sessions can take advantage of EMS memory and XMS memory.
4. DOS compatibility is excellent.
5. 'Applettes' distributed with the OS/2 2.0 program provide plenty of functionality.

The five worst aspects

1. OS/2 2.0 is a resource hog, both in terms of RAM and disk space.
2. The new Workplace Shell will require some relearning.
3. Ctrl-Alt-Del reboots your computer without giving you the option to close only the offending application.
4. No native OS/2 2.0 applications yet exist.
5. OS/2 2.0 cannot run Windows applications in Enhanced mode or 32-bit Windows applications.

not boot from it. So you must choose between performance and compatibility. A good compromise is to install OS/2 in a root directory FAT partition big enough to run all your DOS applications and format the remaining space as HPFS. You can then move many of the OS/2 system files and the swap file to the HPFS partition to take advantage of its increased performance.

Is it solid?

OS/2 2.0 has gone through what may be IBM's most extensive public beta test ever. In addition to IBM's internal testing, early releases of the OS/2 2.0 beta version have been available to members of IBM's DAP (Developer's Assistance Programme), as well as selected corporate customers in the EEP (Early Experience Programme). In addition, IBM made beta copies available to anyone in the US willing to call its NSC (National Support Center) BBS in Atlanta and pay between \$US60 and \$US80 for the cost of duplicating and shipping the disks and preliminary manuals. IBM has received online feedback from users of both OS/2 1.x and OS/2 2.0 beta version through the NSC BBS and the IBMOS2 Forum on CompuServe.


IBM's own compatibility lab has been testing and debugging compatible systems in co-operation with other PC vendors and, as we went to press, there were 94 systems from 20 vendors certified as compatible. This broad-based testing has provided IBM with a great deal of experience in the problems of running Version 2.0 on a wide variety of non-IBM systems, and has hopefully resulted in a relatively bug-free final version.

But no matter how solid a product OS/2 2.0 turns out to be, IBM must still provide technical support. Traditionally, IBM has asked users to seek support from their dealers or, for large companies, from their System Engineers. This is still the case, although IBM announced at press time that a 008 number will be available for support, and the company's bulletin-board system will service online help enquiries.

Nor does IBM have a good mechanism for distributing future bug fixes (Corrective Service Diskettes or CSDs in IBM parlance); this could present an enormous problem for those who need them. Currently, CSDs are distributed through IBM's dealers and field representatives, and can be downloaded from IBM's BBS. But the CSDs generally consist of five or more disks, and not many users will want to spend the time or money to download files that large.

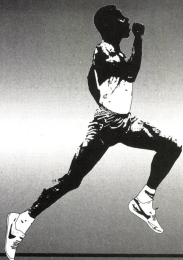
Is OS/2 2.0 for you?

People's first worry when thinking about using a new operating system is whether there are programs that run on it. Due to the care IBM has taken to ensure that DOS, Windows and OS/2 1.x applications will run under OS/2 2.0, this is much less of an issue than it was in the past. Still, since OS/2 2.0 has not even been released as of this writing, there aren't many applications out there that take full advantage of the operating system's power. But there should be some soon. Borland International recently announced a C++ compiler for OS/2 and a number of other vendors have committed to porting their applications over to OS/2 2.0. With the Workplace Shell, it is designed to be a high-powered operating system with an innovative, object-oriented GUI. IBM promises that this will be the OS/2 we have been waiting for, solving all the problems of OS/2 1.x and adding more features.

IBM is down to the wire in smoothing out the rough edges of this ambitious operating system. What remains to be seen is whether IBM can effectively market the product, especially in the light of the Windows 3.1 announcement. Still, any users who want to take full advantage of the inherent power in their 386 and 486 systems will want to try out OS/2 2.0. 

OS/2 Version 2.0 costs \$250, and is available from IBM, tel (02) 634 9111.

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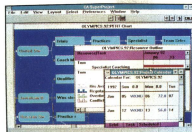


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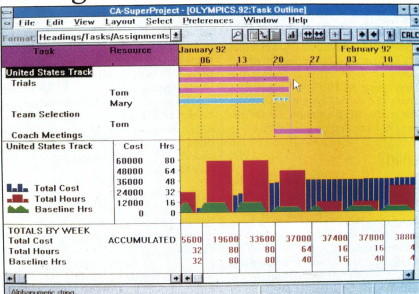
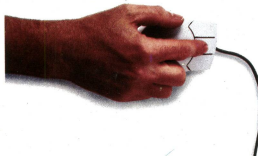
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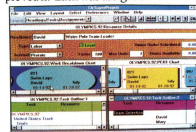
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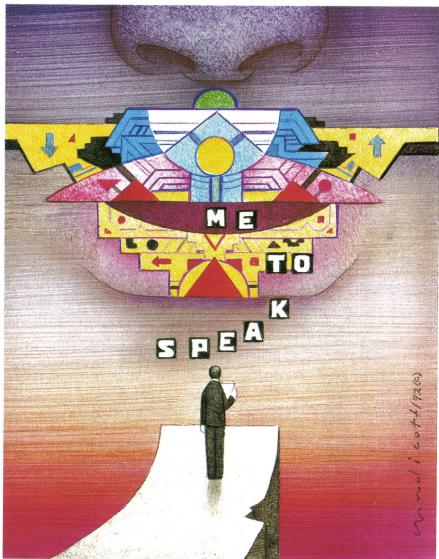
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VOICE MAIL:

IS THERE ANYBODY OUT THERE?



Despite giant steps in technological development, voice mail has seen slow market growth in Australia. Helen Dancer explains why.

In the same way that housewives are being replaced by 'home duticians' and garbage collectors are now exponents of the science of 'garbology', there's no such simple thing as voice mail any more. The new term, so I'm told, is 'voice information processing'.

The technology of voice-processing systems has been leaping over that of answering machines since the early '80s, but an historical lack of understanding about what differentiates the two has seen apparently slow market growth for voice-mail systems in Australia.

Both the US and UK markets have been earlier but not necessarily faster in their adoption of voice-mail technology. Market acceptance of voice mail in both countries was achieved in a window of about five years and now represents a significant portion of business expenditure on technology. The voice-mail market in the US is conservatively estimated at 200,000 ports (or lines) per year. This figure is not representative of market penetration in Australia, but the scant data available suggests that Australia

will represent voice-mail technology's next big wave, and that the demand for this technology is rapidly growing.

The integration of voice processing and replication of the primarily telephone-based technology to the PC environment is no longer in the realm of games and gadgetry, a synthetic shadow of the real you. Dedicated telephone-based voice-mail systems, which interface to the caller as a sophisticated sort of answering machine but in fact provide vast functionality to users, are already widespread. The transition to accessing voice messaging and processing on a PC is slow but inevitable, and there are several technological developments pushing the pace.

Voice processing has been long regarded as a toy, a gimmick and a gadget. The uses of voice on PCs have generally been left to those who have time for it, and are not considered part of the domain of serious computer users.

In fact, Macs have long had voice-processing capabilities. The Mac world is renowned for the myriad startup noises which are far removed from the conventional computer beep, and include catch phrases from movies such as 'Gooooo Mawning Vietnam!' and error messages which range from the humorous to the obscene.

But time and technology have brought this capability into the business arena with some interesting and useful applications.

Uses for voice mail

There are probably as many uses for voice information processing as there are users. Telogy Australia's managing director Peter Granger asserts that one of the major benefits of voice processing is that it gives back to the caller some control over what

The (un)importance of telephone calls

Next time you pick up the telephone, think about this.

AT&T conducted a survey in the US into the effectiveness of telephone communications. The study found that:

- 68 per cent of all business calls are not completed on the first attempt
- 55 per cent of all calls are for the one-way transmission of information
- 67 per cent of all calls are considered less important than the work they interrupt
- 76 per cent of all calls do not require an immediate response.

happens to the call. Most commonly, callers who ring and are answered by or transferred to voice processing are given a menu of options. Callers can elect to leave a message for a particular person or be fed through the system to a real person. Callers who simply want to leave information can be assured that the message, the whole message and nothing but the message will be delivered to the right person. On the other hand, callers who want to make an enquiry but find the telephone unattended will be transferred by an intelligent voice-processing system to another person who can help, not just someone in close proximity.

Granger also cites the accuracy of information as an important benefit of voice mail. Voice-mail information systems can be relied on to give definitive, accurate information because they have been recorded by the person who knows. Banishing 'Well, I'm not sure, but I think...' would certainly be a valuable stepping stone to minimising telephone frustration and improving productivity.

Management has found that voice mail can be a much more effective way of keeping in touch than any meeting or paper-based means yet devised. Messages about

company results to staff in far-flung locations delivered in the boss' own voice imply a greater degree of connectedness than a faxed memo headed 'Dear Staff'.

Sales managers have also used voice mail to great effect, cutting down telephone time as a result. A voice-mail systems administrator for a large company quizzed two of the sales managers who had each clocked up 2000 minutes per month of system time, which seemed disproportionately large. Both were using voice messaging as a replacement for directly talking to the sales force. In so doing, they had gleaned exactly the same information, but cut down telephone time from six hours per day, to two hours voice-mail time and half an hour live time.

Apart from the ability to impart information to a person, whether they are by their telephone or not, the outboard benefits of voice-mail technology are also abundant. Any user can simultaneously broadcast the same message to a number of people, saving time while also ensuring that a message will be received.

An American cookie franchise has adopted voice mail to keep its outlets in touch with each other and head office without taking staff time away from the most important part of their day — serving cookies to customers. In this instance, the telephone doesn't even ring at the franchise; any messages are waiting to be received during downtimes or at the end of the day. Information flow and customer service have both been improved since the implementation of voice-mail technology.

Voice processing can be effectively used as a message line for often repeated information, freeing up people for other jobs as well as easing the amount of telephone interruptions faced during the working day.

To the initiated, voice processing can also speed up transfer to the call destination. Voice mail at the point of entry into a company's telephone system will act as a traffic cop, allowing callers who know the extension of the person to whom they wish to speak to bypass the operator. On the other hand, callers needing operator information or assistance are given the option of dialling a number to be transferred to the operator. Since a large number of inter-

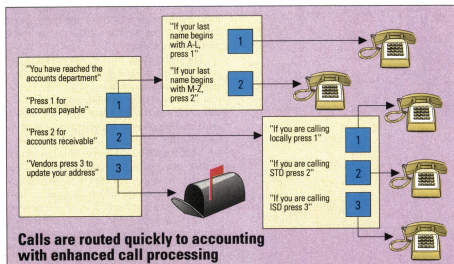


Fig 1 Combining multiple Enhanced Call Processing mailboxes allows a caller to access various menu choices to reach a specific destination

business calls are found in the first category, voice processing can both shorten the length of time needed for each telephone call and reduce the number of calls with which the operator has to deal.

This last issue is a contentious one, however, and most suppliers and larger users of voice-processing systems are adamant about following the golden rule that callers must always be presented in the first instance with a human interface. (During research for this feature, only one of the voice-mail suppliers contacted used a voice-mail system to answer the call.)

Get out of jail free

The term often used in this industry, 'voice-mail jail', refers to the most common criticism and stumbling block for wider acceptance of the technology. Being trapped inside a voice-processing system which offers more and more options and transfers callers time after time to unattended telephones is a problem which is logistically difficult to overcome.

Universally, suppliers of voice-mail technology stress the same issues: the importance of an initial human interface and context sensitivity. There are many inter-

and intra-organisation uses for voice mail, and the answer seems to lie in careful system construction and what Otel's Bruce Woodrey terms 'elegant architecture'.

In fact, the psychological barriers to the wider acceptance of this emerging technology are not dissimilar to the conventional problems faced by early users of answering machines. The problematic thought 'I don't want to talk to a machine', or 'that won't answer my question' is replaced in this case by the latent fear that the computer will crash, be turned off or be otherwise inaccessible, and that leaving a message is fruitless. Additionally, voice-mail jail is more frustrating than a non-answering telephone, and can be the cause of vexation and lost productivity, from both a caller and telephone-owner point of view.

Oposing schools of thought exist on this issue. Industries such as insurance and other financial institutions expressed concern for their customers, particularly those who are older and less likely to be familiar or comfortable with the technology. Acceptance of the technology in this area is dependent, naturally, on being context sensitive and considering the customer's customer. Carole Price from AAP Communications Services, which distributes

Otel products in Australia, conversely reports favourable responses from voice information processing installations servicing older customers.

"They have found that these customers benefit from voice processing because callers can increase the volume of the message from their own telephones if they need to, and can replay the message over and over again. Nobody gets cross at them for not hearing fully or not understanding first time around, and they can listen to the information as many times as they need to without taking up a person's time."

On the implementation side, perceptions that the cost is high and the processing power required will be a drain on computing resources are negatives that need to be resolved, along with a better understanding of what technology exists, and what it currently has to offer.

The hard facts — voice enabled architecture

Building voice mail into an existing PC or PC network requires the computer to have voice or multi-tone processing capabilities.

Apple has always built its PCs with voice-processing capabilities, whereas the

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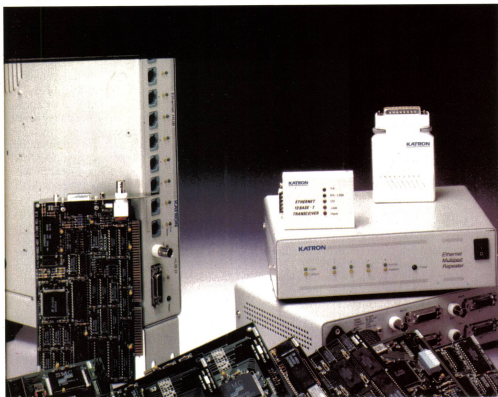
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standard IBM-compatible PC emits only a single beep.

On startup, Apple computer emits a sound which is a chord rather than a single note tone, indicating that the machine is capable of processing the different tones of composed sounds and voices. This means that Apple Macs can store and replicate such sounds without the need for any hardware modification.

New Apples, such as the PowerBook range, are also equipped with a microphone, which facilitates voice-in as well as voice-out capabilities.

Voice processing and storing can be achieved on a PC by the addition of a voice card, which gives the PC the tonal flexibility to receive, store and replicate voice messages.

These voice cards, or I/O boards, interface with the telephone network, processing the signal from analogue (which is the sound waves made by voices) to digital format in which it can be stored in the PC, and then from digital to analogue to be replayed. This ability to capture and replay voices allows the computer to act as a dictaphone or intercom with a programmable delay, storing and sending messages for other people and allowing users to receive messages, append their own comments to messages received and send them off to a number of other people.

One problem with user PC-based voice-processing systems is that the technology, because it is interrupt-driven, becomes very power hungry. Because of the user's ability to repeat and pause messages, the signals travelling backwards and forwards cause the PC's performance levels to suffer.

Characteristically, since the application for voice mail on a single system is limited, small installations can be effectively achieved by applying a LAN-based voice-capable system.

Consultant Paul Shortis from Brisbane distributor Digital Solutions implements such voice-mail systems constructed from the myriad hardware and software jigsaw pieces imported from the US. These voice-mail installations typically consist of a LANtastic peer-to-peer network operating system which has voice-processing capabilities built in, supporting the addition of a telephone handset-like sounding-board adaptor which interfaces to a voice-active version of electronic mail. In this way, users can integrate voice to text messages or send pure voice messages instead. Systems constructed in this way represent a 'quick fix', applying a new capability to an existing investment in technology. As the number of LAN installations grows, voice-mail technology will become a more accessible, lower-cost addition, as the infrastructure will more commonly already be in place.

This solution relies, however, on the use of a purpose-designed handset, an extra component required to make the system work, as opposed to many other systems which need only a conventional telephone. It also implies that each terminal is capable of locally storing and processing information on its hard drive.

Group communications consultant Mark Ginsburg suggests there's a better way: individually located voice mail requires each terminal to store and process messages for that user, and assumes that each terminal in the network has the processing capability to do so with no loss of functionality for other tasks. If, however, the system comprised one additional terminal which acted as a server for voice-mail processing, this server would be responsible for storing and delivering voice messages in much the same way that electronic mail is currently managed. The analogue/digital/analogue conversion or embedding which is required to store and replay voice mail is managed from the server with no loss of function to the user terminal. Using a product such as Simpact's Remark!, an integrated PC acting as a voice server is connected to the PABX. To send voice mail, the user clicks on an icon which sends a message to the voice server across the LAN. The server which is responsible for the analogue to digital conversion recognises the signal and instructs the PABX to call the user, who then picks up the telephone to begin recording the message which is managed (that is, converted, stored or sent) at the server.

One strategic factor in the rise of PC-based voice processing is the falling cost of hardware. The lower cost of 386 and 486

PCs has meant that the extra processing power required is more readily available, and that relatively low-cost systems can be constructed by smaller users not ready to make the leap to dedicated voice-mail systems.

Elegant architecture

The architecture of a successful voice mail, however, involves much more than the physical connection. Woodrey describes the interfaces and attention to the applications context of Octel's voice information processing installations as the 'elegant architecture' which contributes so much to the integration of voice mail into a company's work processes.

Octel's voice-mail architecture lies midway between the two conventional PABX-based and PC-based systems. The system comprises a 386 processor which, instead of being a PC masquerading as a voice-mail processor, is simply that — a dedicated processor, forming the base of the message-handling and storing service.

Removing the responsibility from individual terminals means that not only will these computers continue to function efficiently, but the message relay and storing will not be compromised. Because voice mail is comprised of a recorded lexicon from which the system retrieves the words it needs to adequately communicate menus and options between the real voice messages, the demand on individual PCs to process this capability means that, as Woodrey says, "the... words... begin... to... br... eak... up, whereas with dedicated processing power, the system can support conversations on up to 72 ports in real-time."

Messaging on the move

Finding BHP's Gary Buck in his office is not an easy task, but talking to him is much easier. Callers to his Melbourne office most often make contact with the synthetic Gary Buck, courtesy of voice mail, inviting them to leave a message. If the thought of speaking to a machine is overwhelming, callers are invited to press '1' on their telephone and be transferred to a real voice somewhere in the vicinity of Buck's office.

The messages that are left on the voice-mail system are stored until he returns to the office, or if he has left for the day, the system is programmed to ring him at home to let him know who has called and why.

Buck is also connected to electronic mail without having to carry a portable computer with him because his secretary provides the link between the two technologies by reading his E-mails onto the voice-mail system.

The interactive features of voice mail, such as the ability to dial another digit or series of digits and take another path in the telephone network, make the system a big improvement on a conventional answering machine. Buck acknowledges, however, that there's still a psychological hurdle that needs to be overcome and estimates that of all his calls, at least 10 per cent still hang up after finding the synthetic rather than the real person on the other end of the line.

He believes the speed of this transition will rely on the responsibility of the person receiving the calls. "If you leave me a message today, and I call you back today or tomorrow, then you'll be more likely to leave a message next time you encounter a recorded voice. But if I don't answer the call, it reinforces the perception that talking to a machine can be a waste of time."

Elegant architecture is also Woodrey's answer to overcoming the barriers to the acceptance of voice-mail technology, from simple things such as altering the accent of the interface from country to country or providing multi-lingual options, to providing adequate 'get out of jail' options and voice-processing options for the benefit of the customer's customer, rather than as a screen between callers and the people to whom they need to talk.

The telephone keypad also demonstrates some logic in applying itself to replaying and managing messaging, denoting numbers on the left-hand side of the keypad — that is, 1, 4 and 7 — for backwards, repeat or softer commands, while the numbers on the right-hand side — that is, 3, 6 and 9 — denote forward, skip over and louder commands.

Standard telephones rather than computer-connected handsets form the interface in this system, as with most telephone-based voice-processing systems. The telephones may be special sets fitted with lights, which alerts users returning to their desk that there is a message waiting, or alternatively, standard telephones may be used. These telephones alert users that there is a message waiting by emitting an interrupted dial tone the next time that user picks up the telephone.

Productivity: the key

Adaptation of existing installed technology in this way permits integration of voice-mail technology into existing office systems with as little extra investment as possible.

This aspect is key to the market prospects for voice mail. The last decade has been characterised by massive spending on technology, particularly information technology, in an effort to improve productivity. While automation in manufacturing and heavy industry has brought tangible increases in efficiency and output, the white-collar world has not experienced such returns on its investment. Voice processing is a technology for which most of the framework probably already exists in

a large number of organisations, and has the potential, when properly realised, to provide the better information management on which business depends.

The argument for integrated voice mail follows the same logic as is currently being offered by applications software developers for integrated applications — that no one package works the way people do. Work days and projects are not made up of simply words, figures or graphs, but complex combinations of all three. Likewise, the telephone, or the ability to send, store or process messages in vocal form, when integrated into a company's other investments in technology, can make a valuable contribution to the information resource which ensures any company's continued success.

An evolution

Voice processing, which appears as a divergent technology, based in both PABX and PC systems, and from standalone or network, individual or server processor bases, has actually followed a linear development spanning more than a decade.

Voice processing began with Gordon Matthews, who resigned from Honeywell in 1978 to start up the first voice-mail supplier, a company now known as VMX. The company holds the patent from which all other licences and variant technologies have ensued. Despite proliferation of the technology, VMX (which still has a close association with Honeywell Communications worldwide) has maintained a significant share of the voice-mail market, coming a close second in Australia to AAP Communications Services, distributing Octel, which claims market share leadership.

Honeywell Communications' marketing manager Roger Fairbairn likens the implementation of voice-mail technology to the now widespread adoption of Automatic Teller Machines (ATM).

The implementation of ATMs did not seek to replace real people behind bank counters but sought to provide customers

with an optional, additional service. The fact that the technology was visible, accessible and optional is, according to Fairbairn, a crucial factor in achieving critical mass for voice mail. Fairbairn, as with most people contacted, was adamant that a real person should be the primary point of contact for an organisation and that voice mail provides most benefit when used at a supplementary and optional level.

There's a probably apocryphal story about John Paul Getty who, on phoning his own office and encountering a voice-mail jail, stormed in to supervise the dismantling of the entire system, so infuriated at the corporate image it presented of a business community too busy or disinterested to provide customer service.

In the office — setting up

So where do you start in deciding which voice-processing option is best for your business? Rather than be like Getty and adopt the approach of 'if in doubt, rip it out', it's possible to optimise investment in voice mail by a careful assessment of both what you have and what you need.

In the office, it seems, life is increasingly business as usual. Corporate Australia has become accustomed to working late, working weekends and interfacing with the office with the assistance of various technology tools including telephones, faxes, modems and portable computers. Robert Brand, managing director of Connect International, which provides voice-mail services as well as installations advice and support, says that the global village has meant that the working day is now 24 hours long. "People may ring at night, whether they are working late or calling from a different time zone. They need to transmit a message, and while they don't necessarily expect to be answered by someone, they do expect to be answered by something. While it's not necessarily true that people expect a person to be there all the time, they nevertheless expect to be able to pass on the information. That's not true of domestic use so far, but it has definitely become more commonly expected in the business environment."

While this aspect of voice communications is undoubtedly US-driven, the proliferation of trans-Pacific business transactions will mean that we are increasingly required to 'be there'.

Degrees of 'being there' start with the kind of service Connect International provides, leasing voice-mail boxes to individuals or small to medium-sized companies that feel the need for voice mail but may not be able to make the investment in their own system. Message management occurs at the hub at Connect International, and the only interface the customer needs

Power to the people

Users of voice mail have a powerful ally in the Australian Voice Mail User Group. The group uses its influence to pressure suppliers to look after a range of special voice-processing needs and interests, and address issues such as the appropriateness of overseas software to the local market. Widespread objection to one supplier's standard maintenance agreement was turned into positive feedback, with the user group suggesting alterations and working with the supplier company to produce a new agreement which was 99 per cent user-derived.

The Voice Mail User Group can be contacted through Robert Brand on (02) 957 6569.

Users facing implementation difficulties or problems with operators can also seek assistance from the Voice Messaging Bureau Association, a body that is committed to promoting ethical operations and lobbying for standards in architecture and implementation. The Association is often the first point of call, handling complaints and liaising towards a satisfactory conclusion.

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is a telephone. Brand describes telephone-based voice mail as the available, appropriate technology for voice processing and transmitting.

Users who feel ready to make the investment in voice-mail technology may find that the infrastructure afforded by their existing PC system may provide an easy entry to voice processing. PC-based voice mail offers relatively low-cost implementation of the technology to companies with lower processing requirements and technology budgets. Like electronic mail, the system configuration (and efficiency) depends not only on how many users the system needs to support but how many it must support concurrently.

It is this threshold which offers the strongest argument for dedicated voice-mail implementation. Fairbairn agrees with Brand's perspective that telephones are the appropriate vehicle for the technology. "Telephones have an availability objective of 99.9 per cent," he observed. "A 20-storey building may have 400 or 500 telephones. Each of those 500 users cannot afford that technology to fail, and have around a 10-second tolerance level for silence when they pick up the telephone. We are all much more demanding of the telephone system than any other piece of office equipment. We have much lower expectations of other technology. Unlike our telephones, people expect their (or other people's) PCs to be running five days out of seven, and mostly during business hours. This expectation limits the vision people have for the implementation of voice mail via a PC."

While users of a truly integrated system may envisage that they need message waiting signals to be displayed on their PC, Fairbairn points to the simplicity of a system that only requires a telephone with a message-waiting light in comparison to relying on "a bunch of flaky code which may go down for any reason or be accidentally turned off. It makes more philosophical sense."

So, it seems, the answer is to apply the 'less is more' rule. It is possible to implement voice mail with little additional investment in an existing PC network and, depending on the volume of requirement, satisfy demand and improve information flow.

As for the inevitable comparison of voice mail with electronic-mail technology, Fairbairn cites the difference between reading and watching live Shakespeare. "Nothing can adequately replace the tones and modulations of the human voice for communicating a clearer understanding not only of the message but the urgency or concern that accompanies it."

Not that voice mail is inevitably intended to compete with or replace electronic mail; rather it's an ancillary technology with a

complementary, and sometimes parallel, value offering.

Voice processing capabilities have the potential to follow the same path as facsimile machines in the business environment, achieving rapid growth to market saturation. Fax machines, however, have failed to make the same inroads into the domestic market. Voice processing, on the other hand, may find its course steered by an unseen hand.

Domestic voice mail

With deregulation and the introduction of Optus as a second telecommunications carrier, both Optus and Telecom will be striving not only to provide better service but to maintain revenue. One obvious way of achieving this is to offer telephone-based voice mail as an extra service to the domestic market, at a cost which would be competitive enough to threaten existing service providers such as Connect International.

Despite Austel assurances that nothing will be allowed which will cause bumps in the 'level playing field', there is nevertheless concern in this area, as Austel derives its primary source of income from this service, in contrast to both carriers for which the service is merely icing on the cake.

Consider that when you telephone someone on a Telecom or Optus line and the line is tied up but not answering, it is costing the provider money rather than raising revenue. If that telephone were answered as a matter of course, the call would become a revenue earner, and more likely than not, generate another revenue earning call. Cynically speaking, it is easier to define voice mail for residential use as a way of minimising the cost of an unanswered telephone and providing a 'nice little earner', than as technology offering significant benefits to domestic telecommunications users. Properly managed, voice mail is designed to avoid rather than promote telephone tag.

Domestically speaking, too, though the bulk of voice-mail offerings come from overseas, it is possible, as always, to find elegant, sophisticated solutions which are made in Australia.

Made in Australia

One such company is Telogy Australia, formerly Talking Technology Australia, which has designed and developed a range of voice-mail software, including Australia's —indeed the Southern Hemisphere's—first applications generator.

From the multitude of applications to which voice processing can be honed, such as auto attend, auto answer, voice recognition, menu offering, auto entry, tele ordering and quick-service access numbers, it is

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Running voice mail in your office

The cost of voice mail depends largely on what you want. A voice-mail box leased from a service provider, such as Connect International, involves a login and training fee of around \$50 and rental of \$35 per month. As long as the office to which it is connected has a telephone, no further investment is required.

PC-based messaging represents a manageable, entry-level solution for small to medium voice-processing requirements. The cost of server terminal PCs and LANs are the same as the cost of these components for any other purpose, and the additional costs include voice-enabling I/O boards and the necessary voice-mail systems and applications software.

The cost of storage space may be a significant factor, however. Paul Shortis from Digital Solutions estimates that in standard mode, an average storage requirement would be eight Kilobits per second (Kbps) and 4Kbps in compressed mode. Peter Granger from Telogy Australia estimates that a company of 50 to 100 employees would need around 100M per day. Using a sophisticated compression algorithm processing voice data at 32Kbps, the computer would store 60 minutes of speech on 115M of hard disk space.

Dedicated voice-mail processing starts at \$35,000 and could cost up to \$750,000. It obviously represents a long-term investment and commitment to implementing such a system, and is suitable for companies that have a very focused vision of the benefits voice information processing technology will deliver.

hard to grasp how much time and effort is involved in developing each application. Telogy has been writing applications for around three years, and Granger estimates that the first one took 1600 hours to complete. While the development was a first, the labour-intensive nature of the process was obviously not a satisfactory foundation for a thriving software house. The solution was found in the development of the applications generator with which a complex solution can be constructed in a few hours.

Granger admits that impediments to the growth of voice mail in Australia have been largely beyond the control of Australian suppliers. These relate to incompatibility problems of overseas boards with Austel standards and slow growth of the technology precluding the ability of local industry to support the costs of manufacture, but sees no reason why, in terms of software, it can't be better made in Australia.

Voice-mail technology is in fact being developed so well locally, it is being exported to Denmark to be used by a Copenhagen bus company. The voice-processing system, called VOCAL (Voice Operated Computer Access Link), has been developed in Australia by Ipex Software Services. It is a computer-based telephone communications system that provides a 24-hour telephone messaging service and information centre.

The bus company's passengers use their telephone keypad to access prerecorded information about bus timetables. The system was installed by another Danish telephone company which recognised that certain features of the VOCAL system complemented inadequacies in its own voice-processing offering.

The Danish system stores speech in RAM or EPROM, whereas the VOCAL system stores speech on hard disk; a feature that delivers improved speech capacity.

According to Ipex's director Fausto Marasco, developing in line with Australian market demand sealed the success of the product overseas. The competition, which came from the US, was rejected because of its inflexibility and inappropriateness to the circumstances. With such a large market at home, US developers lack the incentive to design flexible systems which can be applied beyond their own doorstep. Australian companies, Marasco says, are smaller than their US counterparts and require a lower entry level with a more gradual upgrade path. Flexibility in design and implementation is a good way of ensuring that a system installed will deliver maximum benefit to each individual user.

Standards

Many of the major voice-mail suppliers worldwide hold membership of AMIS, the Automatic Message Interface Standard body which seeks to establish guidelines for suppliers and users of voice-mail technology. In much the same way that users of disparate PCs with different operating systems have long suffered compatibility problems, users of divergent voice-mail technologies will be unable to optimise their investment by sending voice messages across system boundaries. AMIS' goal is to establish protocols and standards for voice-mail interfaces, or at least document the interface requirements of each, so that prospective purchasers may make informed decisions.

Future technologies

As with most innovations in technology, there are aspects 'just down the track' that will make the system perform better than before, be more useful or fit more com-

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pletely into existing work processes. And as with most future technologies, 'then' is 'now' — many of these already exist, but not at a price/performance level that makes them a worthwhile investment.

Such aspects include the transposition of electronic mail to voice mail, the integration with fax technology, and the further development of voice recognition.

The transposition of electronic mail to voice is possible, according to Roger Fairbairn, with the technology needing to overcome several syntax problems in the process. The differences between speaking and writing \$10,000, for example, require the program to exhibit the intelligence to recognise and translate the written \$10,000 into the spoken ten thousand dollars instead of dollar sign, one, zero, comma, zero, zero, zero. VMX patented text-to-speech technology in 1986, and it is currently possible to write generic applications for a PC, take the text message through the software, convert the address to the appropriate mailbox number, voice synthesise the message and convert it to some sensible speech pattern.

Integrating voice mail with fax technology is also possible with products such as Faxlogue — the fax-enabling component of

Trilogie Infinity. Trilogie is a range of message management systems from US-based Converse Technology, which is represented in Australia by GEC Plessey Telecommunications (GPT). While the system is more suited to clients in the league of Optus or Telecom rather than servicing the average business' voice-messaging requirements, it nevertheless demonstrates that the technology exists, albeit in a format that is still largely inaccessible to the average user.


Think of voice recognition, and thoughts turn to Hal, the ultimate computer. When PCs become smart enough to distinguish tones of voice, accents, inflections and other vocal idiosyncrasies, and rationalise these differences sufficiently well to recognise the same word spoken in many different ways, I doubt they will still be content to take orders from mere mortals, even if they understand every word. Voice recognition remains, as Peter Granger describes it, at best, "an imprecise science" available at a price/performance level that makes it an unsatisfactory solution.

Summary

Voice mail presents a very appropriate application for people on a fast track to adopting technology. Information-inten-

sive industries, such as accounting and legal practices which have been slow to move into areas such as networking and the adoption of technology in general, may see voice mail as an attractive alternative for communicating quantities of information without typing. When the need to communicate arises, the instinct is still to reach for the telephone, and it is much easier said, and faster, on a telephone than on a keyboard.

Shortis sees the lack of awareness of the availability and ease of use as factors inhibiting the further growth of voice-mail technology. The costs involved and the wrangling among suppliers about the value of one system type over another is also an issue of complete confusion. The successful implementation of voice mail is also strewn with people issues and, as such, demands individual rather than broad brush answers.

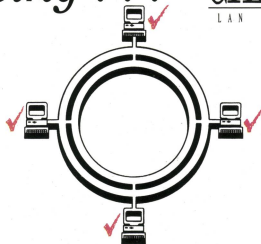
The success of voice mail in the PC market, whether telephone or PC based, ultimately depends on its ability to demonstrate a tangible improvement in the communications infrastructure and return on existing investment, on which better business will continue to depend in the coming decade. 

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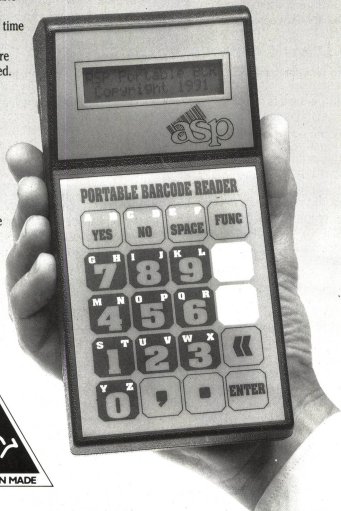
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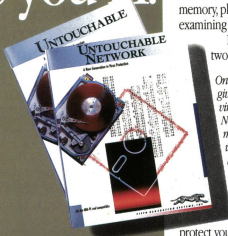
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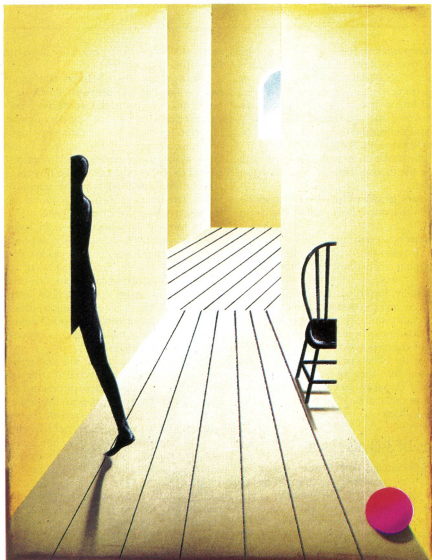
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3-D displays

The past 10 years have seen rapid advancement in three-dimensional techniques and technologies. Hardware has improved and become considerably less expensive, making real-time, interactive manipulation of true 3-D computer-generated images possible. Today, 3-D imaging is becoming an important tool

in areas such as molecular modelling, photogrammetry, flight simulation, CAD, visualisation of multi-dimensional data, medical imaging and virtual reality. The improvements in speed, resolution and economy in computer graphics are just one part of the 3-D equation. The development of liquid-crystal polarising shutters, liquid-

David McAllister explains how the combination of fast computers and innovative display techniques makes possible a variety of systems for creating and manipulating realistic 3-D images.



crystal parallax-barrier methods and multi-planar displays has made the interactive manipulation of 3-D computer-generated images an important and useful capability.

This article discusses how advances in 3-D technology have been incorporated into commercial 3-D display devices. I've limited the discussion to technologies capable of producing computer-generated images that can be manipulated interactively. However, before delving into the technology, it's important to first understand how humans perceive depth.

Depth cues

The human visual system uses several depth cues to distinguish the relative positions of objects in a 3-D scene. These cues are divided into two categories: physiological and psychological.

There are four primary physiological cues:

1. Accommodation is the change in the focal length of the eye's lens as it focuses on specific regions of a 3-D scene.

2. Convergence (or simply 'vergence') is the rotation of the eyes inwards to converge on objects as they move closer to the observer. (If the presentation of an image requires the eyes to rotate outwards beyond the normal parallel position for observing a scene, it's described as being walled; images that require this condition are not correctly presented.)

3. Binocular disparity is the difference in the images that are projected on the left and right eyes when they are viewing a 3-D scene. The visual system uses this salient depth cue to produce the sensation of stereopsis or depth.

4. Motion parallax provides differences in views of a scene by moving the scene or the observer. You can determine the depth of two points by observing how much they move relative to each other. As you move your head from left to right or up and down, the points closer to you appear to move more than the points farther away. This is called the 'look-around' capability. Moving your head produces different views of the scene.

Psychological depth cues include the following:

1. Linear perspective is the property of vision that causes the size of an image on the retina to change in inverse proportion to changes in the distance between the object and the eye.

2. Shading and shadowing are important lighting properties in a scene that help you determine the shape and depth relationships of objects by their positions with respect to light sources.

3. Aerial perspective is the property that causes objects that are farther away to appear less distinct and cloudy.

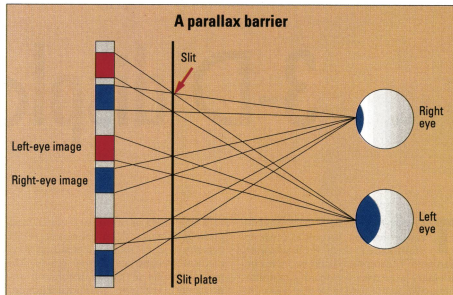


Fig 1 This cross section of a parallax-barrier system, seen from above, shows how the system sends different images to each eye. When you are at the correct distance from the slit plate, each eye only sees the image strips meant for it. The slit plate occludes information meant for the other eye

4. Interposition (or occlusion) occurs when one object hides or overlaps another. You assume the object hiding or overlapping the other object is closer. Retinal image size, and your knowledge of the world and the size of objects, also help you determine the depth of objects. If you perceive the height of an elephant to be the same as that of a mouse, you assume the mouse is much closer than the elephant.

5. Texture gradient helps you determine depth by the amount of detail visible on an object.

6. Colour is used in various ways to sense depth. In general, brightly coloured objects appear closer than dark-coloured objects.

Normally, depth cues are additive: the more there are, the easier it is to determine depth relationships in a particular scene. In some situations, however, certain depth cues are more powerful than others. For example, the effects of interposition can be so strong that they overpower those of binocular disparity. In situations like this, you can perceive depth relationships that are anomalous.

Types of 3-D displays

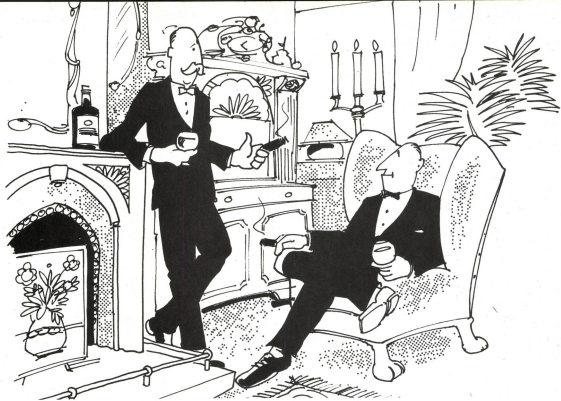
Most 3-D displays fit into one or more of three broad categories: holographic, multi-planar or stereo pair. In general, holographic and multi-planar displays produce 'real' or 'solid' images within which the physiological depth cues are consistent. These images do not require special viewing devices and hence are called

autostereoscopic. They normally have the look-around property.

Holograms are perhaps the most familiar form of 3-D displays. To create a hologram, you record the interference pattern produced by two laser beams originating from the same source on a very high-resolution photographic medium. One beam strikes the recording medium directly, and the other bounces off the objects in a scene and interferes with the reference beam. The interference pattern allows the reconstruction of the original scene.

By moving horizontally (or, in some cases, horizontally and vertically, depending on how the hologram was made), you can see continuously changing views of the scene. Holograms can also contain psychological depth cues, such as interposition and colour. The technology, however, has not advanced to the point where it permits interactive manipulation of computer-generated images.

In stereo-pair displays, left and right-eye 2-D images are directed to the appropriate eye. These displays depend on binocular disparity to produce the sensation of depth. Displays based on stereo pairs normally require special viewing devices, and they don't have the look-around property. Stereo pairs produce a virtual image. Because you focus only at the plane of the stereo pair, accommodation is fixed. Accommodation and vergence are thus disconnected. This inconsistency can make some scenes difficult to 'fuse' (interpret as a 3-D image, as opposed to seeing two separate flat images).



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Stereo pairs in depth

In general, stereo-pair technologies are the least costly of the 3-D display technologies that can be used effectively with workstations and PCs. These technologies take advantage of the full-colour photo-realistic images that you can produce and manipulate using computer graphics techniques. The disadvantage in using stereo-pair technologies is that a large number of people have some degree of stereo blindness: they are unable to use the left and right 2-D images to perceive a 3-D image.

Stereo-pair technologies fall into two broad groups. Time-parallel systems present both eye views simultaneously. Field-sequential or time-multiplexed systems present the left and right-eye images in sequence, using optical techniques to occlude the right eye when the left-eye view is being presented and vice versa.

The best-known example of a time-parallel presentation is the ViewMaster. It provides the left and right-eye images simultaneously. Head-mounted displays are another example of time-parallel systems, as are 3-D movies, which traditionally use the old anaglyph method that requires you to wear glasses with red and green filters.

The main problem with old-style 3-D movies is a phenomenon called ghosting or cross talk. Because the filters don't eliminate the opposite-eye view, each eye not only sees its image but sometimes also sees part of the image intended for the other eye. This results in headaches for moviegoers, giving 3-D in general, and stereo pair in particular, a bad reputation. A more modern time-parallel approach used to show stereo slides and animations to large audiences places orthogonally-oriented polarising filters in front of two projectors. The projection screen is metallic and maintains the polarisation of the reflected light. To see the image, you'll need to wear passive polarised glasses in which the polarisation is consistent with the filters on the projectors. This blocks the right-eye image from the left eye and vice versa. However, because polarisation reduces light intensity, the image is dimmed. Some handheld viewing devices allow the simultaneous presentation of both eye views of a stereo pair on a computer display. These devices are inexpensive and use simple optics. However, they require that you hold your head still, and prolonged viewing may cause physical discomfort. This technique also limits the size of each eye image because both views are present on the screen at the same time and are non-overlapping.

Parallax barriers

One interesting time-parallel technique uses vertical lines, or a parallax barrier, to block the left-eye image from the right eye

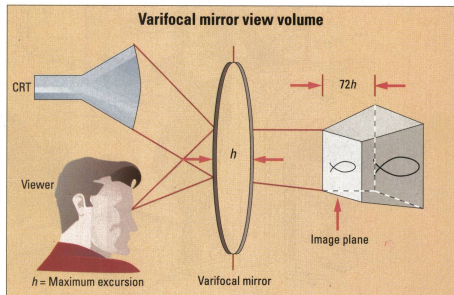


Fig 2 The image magnification is 1.26 when the mirror is concave and 0.83 when the mirror is convex. The shape of the view volume is a frustum of a rectangular pyramid. The software transforms the view volume into a cube. The system can plot 16,000 points in the movement from front to back. About 10 points per centimetre are required to produce a line without severe aliasing, and the total length of the lines in an image cannot exceed 1600cm. The image is transparent and each point can have one of 256 intensities. You can manipulate the images interactively with a computer. This technology will produce points and wireframe transparent images in only one colour

and vice versa (see Fig 1). The image is recorded in strips behind the parallax barrier. Recording several different stereo pairs in strips and correctly registering them behind the parallax barrier provides a degree of the look-around property, although the change in scene is not continuous as you change your position. The technique is becoming very popular for printing static 3-D images using high-resolution colour laser printers. The parallax barrier is printed on one side of a transparent medium, and the image strips are found on the other side. Backlighting the display is required because the barrier blocks a considerable amount of light.

Recent advances in electro-optics have made possible computer-driven parallax-barrier displays. Dimension Technologies (in the US) manufactures a colour display device based on parallax barriers that is autostereoscopic. The display can be driven by a Mac or a PC. The system uses a transmissive image-forming display — essentially an LCD in front of, and spaced apart from, a special illumination plate.

The plate produces many thin, bright vertical illuminating lines, with a dark space between each line, and with one line for every two columns of pixels. Sitting at an average viewing distance from the display, you view all the light lines through the odd-numbered columns of pixels with the left eye and through the even-numbered columns with the right eye. Because the

display is transmissive, there must be illumination behind a pixel before it can be seen. The left-eye view of a stereo pair is displayed on the odd columns, and the right-eye view is displayed on the even columns.

Field-sequential presentation

Field-sequential presentation devices (which display the images to each eye sequentially) have made rapid progress in recent years. Early field-sequential systems used mechanical devices to occlude the appropriate eye during CRT refresh. The images alternate in sequence: when the left eye is obstructed, the system displays the image intended for the right eye. Similarly, while the right eye is obstructed the left-eye image is presented. Consequently, these systems require at least two internal buffers — one for each eye — and a mechanism for switching between the two buffers at CRT refresh speeds. For best results, you need a CRT with a 120Hz refresh rate. Each eye is presented with an image at 60Hz, significantly reducing flicker. With field-sequential displays, the image size is not sacrificed because the left and right-eye views alternate.

Two electro-optical techniques are supplanting mechanical field-sequential devices. They use liquid-crystal technology and polarisation to either transmit or occlude an image from a CRT to the ap-



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appropriate eye. One technique uses 'active' glasses and the other uses 'passive' ones.

US firm StereoGraphics makes a system that uses active glasses. A 'stereo-ready' computer uses an infrared emitter to send a synchronisation signal to the glasses. Based on the signal, the glasses (lightweight LCD glasses powered by batteries) alternately occlude and transmit the image displayed on the system monitor to each eye.

Another US company, 3D TV, manufactures an inexpensive active-glasses system for PCs. Because it depends on the refresh rate of your monitor (which is usually below 60Hz for PCs), you may perceive some flicker in the image unless the monitor brightness is adjusted, the room lighting is subdued, and the image is low contrast with a grey background.

The passive-glasses method employs an LCD shutter attached to the front of the display device. To use the system, you must wear polarised glasses, similar to sunglasses. The shutter switches the polarisation of the light emitted from the screen at 120Hz. On refresh, the light is polarised circularly in one direction. The lens on the glasses that is polarised in the same direction as the polarised light allows the light to pass through to that eye. The lens that is polarised in the opposite direction doesn't allow the light to reach the eye. On the next refresh cycle, the LCD shutter polarises the light in the other direction and continues to alternate with each refresh cycle. StereoGraphics and Tektronix market such systems.

Multiplanar displays

The last category of 3-D displays is multiplanar. Multiplanar methods are similar to the volumetric methods used in computer graphics, where the image is subdivided into voxels, or 3-D cubes. A multiplanar system divides an image into hundreds or thousands of planes (as in a CAT scan) and plots points on the image in each plane. To display the points on each plane, the system usually uses mirrors that reflect points produced by either a CRT or a laser. A possible disadvantage of such systems is that the images they produce are transparent, which can cause confusion when viewing images with high information content.

In the varifocal-mirror technique, you divide a 3-D scene into thousands of planes and have a point-plotting CRT plot one point from each plane. A circular mirror vibrating at 30Hz reflects these points into your eye. The receptors in the eye have a temporal persistence that fuses the light emitted from the moving mirror to create the volume image. The Spacegraph varifocal mirror marketed by US firm BB&N is an example of this type of system.

Such a system uses a directed-beam, calligraphic or vector type CRT with electrostatic rather than magnetic deflection, and it plots a point in less than one microsecond. The CRT requires a fast phosphor with short persistence to preclude image smear caused by the moving mirror. The P-46 green phosphor is the only phosphor that decays fast enough.

The mirror's vibration rate must be at least 30Hz to prevent image flicker. The mirror is a flexible membrane or a flexing plate driven by a low-cost, low-frequency audio transducer (or woofer). The maximum diameter of the mirror is approximately 48cm to avoid excessive noise and sympathetic vibrations in surrounding structures. The mirror excursion is about 0.4cm. When the mirror is convex, the image distance from the mirror is 55.7cm. When the mirror is concave, the image distance is 84.4cm. Thus, the view-volume depth is 28.7cm, which is approximately 72 times the excursion of the mirror (see Fig 2).

Rotating helix mirror


The volumetric laser display developed by Garcia and Williams at Texas Instruments operates on a principle similar to the one behind the varifocal-mirror technique. The multiplanar-display surface, a double-helix transparent display disk, rotates to fill the display cylinder (see Fig 3). The surface of the helical display disk rotates at 600rpm, creating a cylindrical volume where 2-D images are fused by your eye. You can display images throughout the volume of the cylinder except for a small cylindrical space in the centre of the volume. The

display system uses a laser beam modulated to up to 10,000Hz and synchronised with the displacement of the rotating disk. The disk is translucent, providing persistent 2-D slices that are fused by the viewer's eye to create volume 3-D images. The computer detects each rotation of the disk with an optical sensor on the shaft of the motor. The systems use a 92cm-diameter, 46cm-high volume display, with three colours and approximately 10,000 displayable points. The technology has the product name Omniview.

Omniview uses lasers because they provide for the use of multiple colours and very high resolution. It has the additional advantage of offering a display that can be made fairly large. As with the varifocal mirror, the image is transparent.

The future

Of the different types of 3-D displays available, stereo-pair technology is the easiest to implement, but it's not accessible to all people because of the occurrence of stereo blindness. Multiplanar technology overcomes this limitation, but it's restricted by the transparency of the images it creates.

The goal of 3-D display R&D is to produce an interactive display system with no moving parts that can generate autostereoscopic, full-colour, high-resolution, photographic-quality 3-D images, containing all the psychological depth cues, with the look-around property. Interactive holographic displays fit these criteria, but will it become a commercial reality? The search for the ultimate display technology continues. 

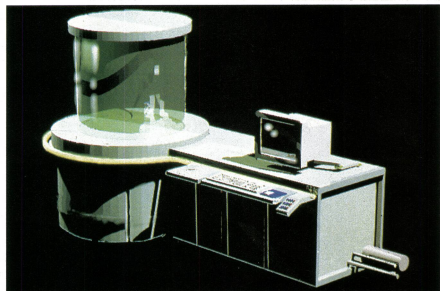


Fig 3 By reflecting lasers off a rotating mirror, Omniview creates a series of 2-D images, which your eye fuses into 3-D shapes (Courtesy of Texas Instruments)



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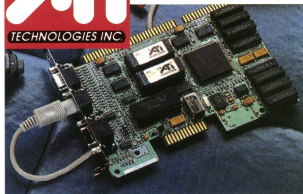
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Radiosity

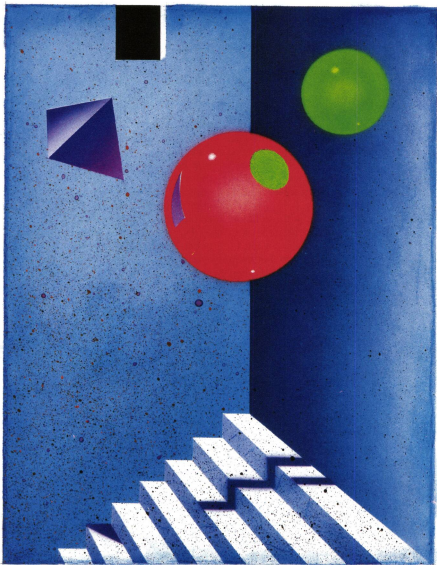
The appearance of real surfaces depends on complex interactions among light, colour and material. The equations used by ray tracing and common rendering software handle specular reflection, but do not account for one of the most important interactions: the interreflection of light between matte — or diffusely reflecting — surfaces. Radiosity methods

treat diffusely reflecting surfaces correctly: objects are illuminated not only by light emitters, such as light bulbs, but also by light reflected from other objects.

Shortcomings of ray tracing

Ray tracing can produce spectacular images — as long as those images contain mainly

Calculating the diffuse lighting and shadows of realistic images can be a complex procedure, as John Wallace and John Fujii explain.



shiny or transparent surfaces. Real environments are often largely composed of diffusely reflecting surfaces, such as painted walls and carpeting. Ray tracing is not particularly good at simulating the shading of this type of surface, and ray-traced images containing such surfaces are often disappointing.

Diffusely reflecting surfaces cause trouble for ray tracing because they reflect light in a way that works against ray tracing's basic strategy. Ray tracing follows a ray's reflection from a surface to determine the point of illumination. (For more information on ray tracing, see 'Photo realism', page 161.) This process is very efficient if the surface is a mirror. Since mirrors reflect light in only a single direction, then only one ray has to be traced to determine what would be seen in a mirror at any given point.

Diffusely reflecting surfaces behave just the opposite: they reflect light in all directions with equal intensity. A ray tracer would have to trace rays that reflect in many directions to figure out the shading at any point on a diffusely reflecting surface.

Any of these rays that reflect and happen to hit another diffusely reflecting surface would, in turn, spawn a whole new generation of reflection rays. The time required to generate an image in this way is impractical, even by ray-tracing standards.

Ray tracers usually simplify the shading of diffusely reflecting surfaces by ignoring the light that other surfaces reflect onto them. Unfortunately, in environments such as the interior of a building, much of the actual illumination is due to reflected light; for example, in most rooms, the ceiling receives light, even though there are often no lights pointed directly at it. The light illuminating a ceiling may originate at a window, bounce from a wall to the floor and then from the floor to the ceiling.

Imagine the problem an algorithm faces trying to determine the shading of the ceiling, which depends on light reflecting off the floor. The algorithm must compute the light reflecting off the floor. However, that light depends on the light reflecting off the wall, so the algorithm must then compute the light reflecting off the wall.

Even worse, the light that reflects off the floor will probably contain the light reflected from the ceiling itself. It seems that the illumination of every surface depends indirectly on the illumination of every other surface. The effect of this reflected illumination is often subtle, but it can play an important part in providing the sensation of realism that many applications demand.

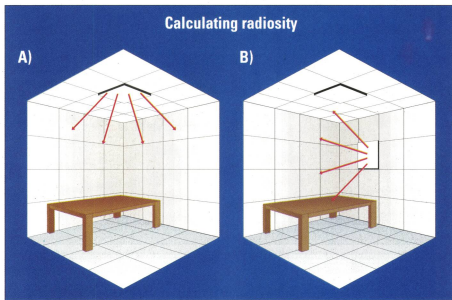


Fig 1 The process of calculating radiosity; the surfaces of a model are first split into small patches. (a) The energy of the light sources is radiated to all other patches. (b) Light is then radiated from one reflecting patch to all other patches, and a new value is calculated for each. The process is repeated until a lower limit of reflected light is reached. This process calculates values that remain constant, no matter what view is used for the final rendering. As a result, once the radiosity has been calculated, the calculation of each frame in a motion series is relatively fast

Radiosity method

Many advances in computer graphics have come when researchers turned to scientific or engineering fields, where analogous problems have often been solved. Radiosity methods originated in the fields of radiant-heat transfer and illumination engineering.

In analyses of problems in these fields, the surfaces of an environment are broken up into small pieces, or patches (see Fig 1). The transfer of radiant energy between each patch and every other patch is then computed, typically by solving a matrix equation. In radiosity algorithms for computing light interreflection, each small patch is a potential source of light energy. A few represent actual energy emitters, such as light bulbs, but most provide only reflected light, which you can imagine as being virtual light sources.

In a commonly-used algorithm called progressive radiosity, the computation of light-energy transfer proceeds in a series of incremental steps. At the beginning of this computational process, the energy of the reflecting patches in the environment is 0. The initial steps of the calculation must first determine the illumination reaching each reflecting patch directly from the actual light emitters.

After this phase is complete, the amount of direct illumination that every reflecting patch receives is known. Each patch absorbs some of the light that reaches it and

reflects the rest back into the environment. In the next phase of the process, one reflecting patch after another is selected and treated as a virtual light source, with its reflected energy radiated out as if it were a true light emitter. Aside from the fact that the source of light is reflected rather than emitted, there is no difference between computing the effect of reflectors and the actual light sources.

The calculations of energy transfer between a source and a receiving patch must account for shadowing caused by intervening objects. One approach is to trace rays from the source to the receiver to detect any such objects and to reduce the total energy transported between the two patches accordingly. Other factors that affect the amount of energy transferred include the patch sizes, orientation and distance between the two patches being considered. The net outcome is a transfer of energy (possibly 0) from one source to all other receiving patches.

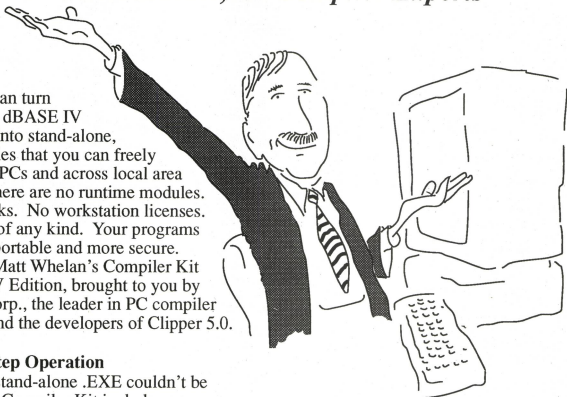
During the process, as successive patches are chosen as the source, the rest of the patches in the environment accumulate additional energy. Each patch may be considered as a source more than once during the process, thus taking into account multiple interreflections, such as light bouncing back and forth between a floor and a ceiling. Because absorption is a major factor in a diffuse environment, no patch reflects all the energy it receives for any step. Energy transfer diminishes as the

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process progresses, and the computation stops when it drops below a specified limit.

One step from an image

The final result is that the light energy leaving every patch is known, and the shading of the environment's surfaces is determined. This is quite different from the result obtained following ray tracing or other rendering algorithms, which produce an intensity value for each pixel in an image based on a particular eye position.

Radiosity does not render an image. In fact, in the preceding description of the solution, an eye position has not even been mentioned. The process has simply added shading information to the surfaces of the scene. You need not choose the view until after the process is complete, at which point a rendering algorithm performs the perspective transformation, determines the visible surfaces and interpolates the precomputed shading data to produce the final image (see Photo 1).

Most important, after an image has been rendered for the selected view, you can choose another view and render a new image using the same precomputed shading. The diffuse shading precomputed by radiosity is independent of the view.

Although the radiosity process may take from minutes to hours to complete, the speed at which new views can be generated depends only on the speed of the software or hardware used to render the final image to the screen. The radiosity process is ideal for PCs or workstations with 3-D graphics accelerators or software for fast polygon rendering. If the renderer is fast enough, the final step can be repeated in real-time, with the view specified interactively using a mouse or a joystick.

Therefore, radiosity provides one of the first opportunities for applications to take advantage of real-time interaction with realistic images.

Applications

In the field of architecture, the ability to combine photo-realism with interactive rendering opens up new possibilities for the presentation of desires. It is expensive and time-consuming to prepare and present realistic hand renderings of plans to a client.

If you can enter or extract a 3-D model description from an existing computerised plan, it is suddenly possible to generate a variety of radiosity-shaded views from any perspective. The client can explore a realistic computer model during the presentation to learn the

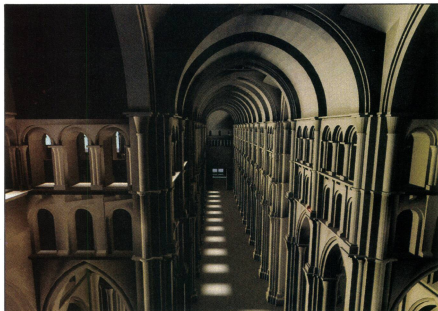


Photo 1 The effect of diffuse lighting is that objects that do not receive direct lighting are illuminated by the lit objects near them. The left side of the hall is lit by the light bouncing off the right side. The image was rendered using HP's Advanced Rendering Technology on an HP Apollo Series 700 Turbo VRX, using data generated by ASB Baudat CAD Service GmbH with IEZ Speedikon software

relationships of plan elevations to the real world and gain a sense of what it will be like to walk through a newly constructed building.

Radiosity's accurate simulation of illumination also offers architects and interior designers a tool for lighting design. It's possible to evaluate the spacing of ceiling lights in an office or experiment with the placement of windows to take the best advantage of daylight.

For CAD and industrial design, one of

"Some of the most dramatic images produced to date are the result of combining radiosity and ray tracing."

the values of interactive rendering is that it lets you move around a model to better understand its 3-D geometry. The soft shadows provided by radiosity can make the relationship between surfaces immediately evident. When realistic shading is combined with interactive viewing, complex geometry can become much easier to understand.


Radiosity is already available in commercial applications and programming libraries—for example, Hewlett-Packard's

(HP) ARTCore radiosity and ray-tracing library. The ARTCore library has been licensed to Ithaca Software, for use in a multipatform Hoops product. Radiosity is also available to end-users of the Wavefront Personal Visualizer on HP workstations and as an option for the HP ME30 mechanical design package.

Working together

Radiosity has limitations, and these limitations have formed the basis for continuing research. Radiosity alone does not provide highlights, reflections or refraction, since it is limited to diffusely reflecting surfaces. These effects are important not only for realism but for providing visual cues about geometry and surface quality. The inclusion of non-diffusely reflecting surfaces in the actual view-independent radiosity process is expensive.

Fortunately, it is possible to partly add these effects during the rendering phase, with effective results. For example, you can add highlights to a radiosity image by simply turning on specular highlights in the graphics accelerator while it renders the radiosity polygons for any particular view.

Even more striking results can be obtained by using a ray tracer as the final rendering engine. Some of the most dramatic images produced to date are the result of combining radiosity and ray tracing. Undoubtedly, future algorithms will draw inspiration from both approaches. 

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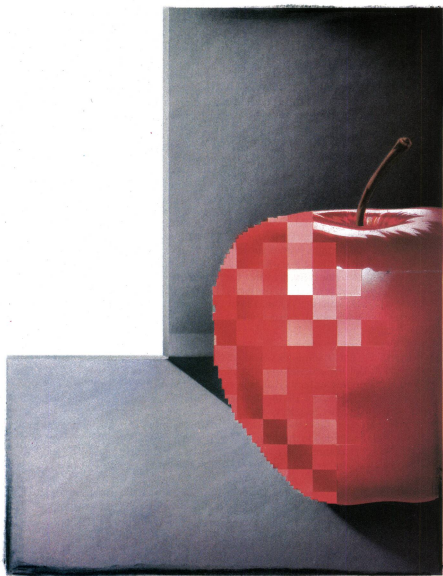
Photo-realism

There are few things so mysterious as how a computer program can create a lifelike three-dimensional picture—not just any picture, but one that can fool the human eye. Sometimes the only clue that a computer-generated image is not real is the fact that it exceeds reality as people normally perceive it. A computer, or more

correctly a computer artist, can create a picture of the dark side of the moon, and only our knowledge that it can't be real prevents us from accepting it as such.

Although computers are unconstrained by physical laws, they create images using mathematical models of those laws. More often than not, the maths must be simplified

*Evan Yares discusses
computing images that look
like real objects and scenes.*



because computers — even supercomputers — are not infinitely fast. Still, creating images that look realistic enough to be photographs (or are photo-realistic) is difficult. Even though some very fast computers (such as the Iris 4D/VGX workstations from Silicon Graphics) can generate impressive images in real time, none can achieve true photo-realism at interactive rates.

Creating photo-realistic images involves two broad steps. An artist must create a mathematical model describing the scene, and then the computer must render that scene into an image file containing a colour value for each picture element (or pixel).

Scene description

In the first step, the computer artist describes the objects, lighting and 'camera angle' of the scene. The most important primitive object is the polygon in 3-D space. More complex objects, such as spheres and curved surfaces, are typically made up of groups of polygons known as meshes. To reduce complexity (at least in the scene-description phase), Pixar and a few other software developers use mathematically generated curved surfaces (often called 'surface patches'). This method is particularly useful in describing non-uniform surfaces. Instead of having to modify individual polygon vertices, the artist can modify the curves that define the surface patch. As images are rendered, these patches are decomposed, or tessellated, into polygon meshes.

Beyond describing the objects in the scene, the computer artist must also describe the lighting and the camera angle, or viewpoint. When describing the lighting of a scene, the artist specifies the type of light source (ambient or point), its colour and its position. The camera angle is the simplest aspect of scene description, but it is the one that determines what objects are seen from which angle.

Rendering methods

Rendering is the process where the magic really happens. The most realistic methods are often the most computer intensive, and absolute realism is not always practical. In a rendering of an office, for example, shadow and light help convey important information. In a rendering of a sunken ship, however, too much shadow and light can obscure information. In fact, the real-time animation of an object's motion or change of state may be more important than producing a realistic rendering; therefore, a wireframe image of the object is all you need.

In a wireframe image, all surface edges are represented as lines and are shown

whether or not they would be seen in real life. The basic problem with a wireframe representation is that it leaves ambiguities that the eye cannot resolve. Draw a wireframe cube, and you can't tell which side is the front. But once you put a wireframe into motion, the ambiguities fall away because of the relative motion of the different lines.

The wireframe is greatly enhanced by removing the portions of lines that would be hidden if the polygons of the wireframe were solid and opaque. There are good general algorithms for hidden-surface removal (or visible-surface determination), but none make the task easy.

Shading

Colouring in the surfaces of an object is only a small step above hidden-line removal. If the effects of point lighting are added, however, the object becomes exciting.

In real life, objects that are perpendicular to a light source are brightly lit, reflecting more of the light than those that

Overall, texture mapping can add tremendous detail to a rendered image without increasing its geometric complexity.

are at an angle. If the normal of a polygon (ie, the unit perpendicular to its surface) points directly at a point light source, the surface is brighter. As the normal points farther away from the light source, the surface reflects less light and it is darker.

Flat shading uses one intensity value for each polygon. The result is a distinctly faceted look. This method is fast and easy, and it's usually adequate for quick views and flat surfaces.

If the objects are composed of smooth curved surfaces, flat shading leaves much to be desired. But the general concept of flat shading is greatly enhanced by interpolation, or the blending of the colour shades of adjacent visible polygons. This requires that a scene be constructed with meshes rather than individual polygons.

With the most common colour-interpolation method, Gouraud shading, the colour-shade interpolation occurs at the edges of polygons. Many graphics workstations and a few PC graphics cards (see Fig 1) implement Gouraud shading in hardware.

Phong shading interpolates the surface normal of every polygon pixel-by-pixel with respect to adjacent visible polygon

normals. Because these normals are used to determine diffuse reflection (and, hence, surface colour), the net effect is that Phong shading is smoother than Gouraud shading. A side effect, however, is that Phong shading is much more processor intensive than Gouraud shading. Generally, Phong shading is implemented in software rather than hardware, and it's not fast enough for real-time display.

Phong shading can generate surface and edge highlights (specular reflections). By varying a surface's specular reflectivity from matte to shiny, the highlights change from broad and soft to small and sharp. Because colour (and reflection) is calculated for each pixel on each polygon, the specular reflection is always properly shown, even in the middle of a polygon. Since Gouraud shading does not interpolate colour intensity in the middle of polygons, any specular reflection there would not be visible. For the most part, specular reflection, or Phong lighting, is used with Phong shading rather than with Gouraud shading.

Phong shading alone has a distinctly smooth, opaque quality, which is acceptable for representing plastic but little else. The majority of the photo-realistic images you might see are created with Phong shading and a variety of special effects, the most common of which are textures, bumps, shadows, reflections and transparencies.

Textures

One way to refine an image is to create a more detailed model with more and smaller polygons. However, there is a point of diminishing return when adding detail with additional polygons. One alternative is texture mapping, the application of images onto a surface, much like the application of decals onto a toy model.

Texture maps can be scanned or stored images (the easiest method), or they can be created by a software procedure. High-end rendering programs, such as Pixar's photo-realistic RenderMan (distributed by Info Magic, tel (02) 975 1044), use procedural texture maps. They are more accurately called shaders because they define the shading of the objects to which they are applied. Although writing a shader program just to create a texture may seem a little extreme, it is sometimes the only way to get acceptable results. Consider velvet — a scanned texture map won't show the nap of the cloth properly, but a procedural shader will.

Because texture maps are generally flat and the objects to which they are applied are not, there can be some interesting complications. Consider how difficult it would be to apply a map of the world to a sphere, and you'll get some idea of the problems.

Overall, texture mapping can add

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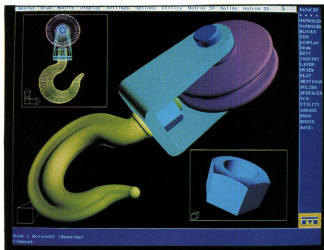
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Fig 1 This AutoCAD design can be rapidly rotated in real-time because the Gouraud calculations are supported by a Matrox MG-3D graphics board. Gouraud shading doesn't produce bright highlights, so the surfaces in this image appear opaque and plastic (Courtesy of Matrox)



tremendous detail to a rendered image without increasing its geometric complexity. A rectangle can become a painting, or a sphere can become a globe. Even though texture mapping is usually handled by software, some workstations (eg, the Iris 4D/VGX) can apply texture mapping in real time through hardware.

Although texture mapping goes a long way towards adding detail to renderings, it still lacks depth. The surfaces continue to

look geometrically smooth. A bump map is an array of displacements that slightly alter the normals underneath a surface. Because the normals are perturbed, the results look like bumps. It's an illusion (look at the silhouette of a bump-mapped object, and you'll see that it's smooth). A more advanced technique, displacement mapping, can displace the surface of an object. Displacement mapping must be applied early in the rendering process because it affects

visible-surface determination. In fact, it could be considered a postprocessing operation to scene creation because it changes the object geometry.

Light and surfaces

Shadow casting would be easy if it were limited to one object and one light at a time. In that case, projecting the silhouette of an object on a ground plane would be sufficient. However, the use of a fake shadow is rarely adequate. Close lights can distort shadows, and objects falling in a shadow's path can complicate matters, too. Accurate shadow determination is identical to visible-surface determination except that it's from the viewpoint of the light source (instead of the camera) and must be repeated for each light source.

Not all objects have a matte surface. Some, such as chrome, are shiny enough to reflect the image of other objects. Reflection mapping (also known as environment mapping) is used to simulate the effect of a reflective surface. Essentially, reflection mapping is a trick, where the objects to be reflected are rendered from the viewpoint of the reflecting object. That image is applied as a texture map. This is a gross

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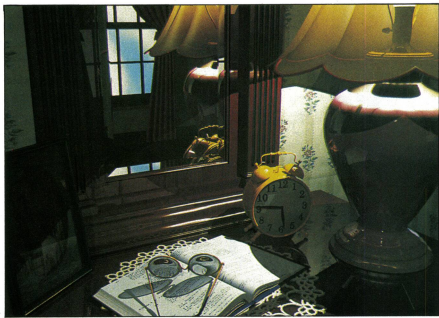


Fig 2 A tremendous degree of realism can be achieved with ray tracing, a technique that is particularly valuable in creating images of objects with transparent or reflective surfaces. This complex image was generated on an Intergraph workstation using Intergraph's I/EMS, Microstation and Modelview. The engineer/artists were Dan Stiles, Jim Cashion and Tim McElyea of Intergraph (Courtesy of Intergraph)

simplification, but some variation of this method can usually be made to work.

Transparency is one of the most difficult effects to create. Because of refraction, light does not travel in a straight line. Objects seen through a transparent object are distorted. If the effects of refraction are not important (eg, when looking through a flat window), it's easy enough to fake transparency. The transparent object becomes a simple colour filter. Any object behind the transparent object is shown, but with its colour value altered.

Ray tracing and radiosity

In some cases, it's not enough to fake shadows, reflection or refraction. The values must be calculated. In these cases, the rendering method of choice is recursive ray tracing. This method traces beams of light from the viewer's eyes back to the light sources and accurately renders shadows, reflections and refractions. Ray tracing is computationally intensive because at any point of intersection a light ray will spawn shadow, reflection or refraction rays. The reflection and refraction rays may spawn another set of rays. This spawning process goes on until the ray reaches a light source or has an insignificant light value.

To determine the intensity value of each pixel of an image, all the rays for the pixel are arranged in a tree, with the viewpoint at the top and the spawned rays branching out below. The ray tree is evaluated from the bottom up, summing all the intensities

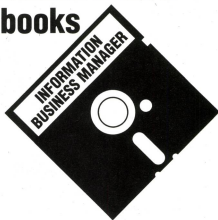
up to the viewpoint. This process is recursive, consuming tremendous computer resources. Because of this, it's common to limit the depth of analysis to a small number of reflections or refractions. The process is rather like looking at a mirror that faces a parallel mirror. Theoretically, the reflections should go on forever, but there is a practical depth beyond which you can't tell the difference.

It would be difficult to trace rays from the light source, following only those that end up at the viewpoint. By tracing rays in reverse, the result is the same (because light energy is conserved), but the process is easier.

Because ray tracing requires so much computing time, few rendering systems use it as the sole method of rendering. Ray tracing is most valuable for modelling reflections and refractions (see Fig 2), so it's often combined with Phong shading, texture mapping, bump or displacement mapping, and reflection mapping (where reflection mapping is adequate).

Ray tracing has at least one other limitation: it doesn't easily model diffuse reflection. Ray-traced images are notable for their hard edges, a characteristic of specular reflection. A practical method of adding diffuse reflection to ray tracing is to combine it with radiosity methods — the new kid in the world of rendering. Radiosity is the term applied to the light generated (either by radiance or reflectance) by objects that are part of the scene (see the article 'Radiosity' on page 155).

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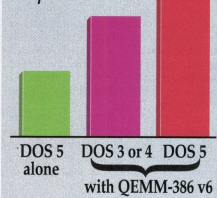
As for the all-important 'conventional' memory area, our new version 6 increases the amount of memory made available. Our exclusive 'optimize' feature automatically seeks out TSRs and device drivers and moves them into high memory—the area between 640K and 1 megabyte. All you have to do is type 'OPTIMIZE'.

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Considering that light is a form of energy, it's possible to use a thermal-engineering model for the emission and reflection of light from surfaces. Unlike other rendering methods, radiosity methods first determine all the light interactions in an environment in a view-independent way. Different views can then be rendered with approximately the same amount of effort as Phong shading.

Radiosity is particularly useful for modelling diffuse interobject reflections. Because of this, it's often combined with ray tracing to add specular effects. The combination yields impressive results.


What the professionals use

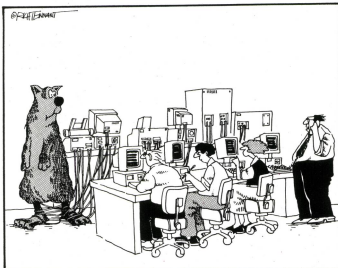
With the breadth of rendering algorithms available, the best pictures come from a combination of techniques. This is evidenced by images created with high-end products from companies such as Alias, Wavefront, Pixar and TDI.

With enough creativity, it's also possible to get stunning results with modest tools available for Amigas, Macs and PCs. For example, Autodesk's 3D Studio software for 386 and 486 PCs is based on a simple Phong shader, with texture,

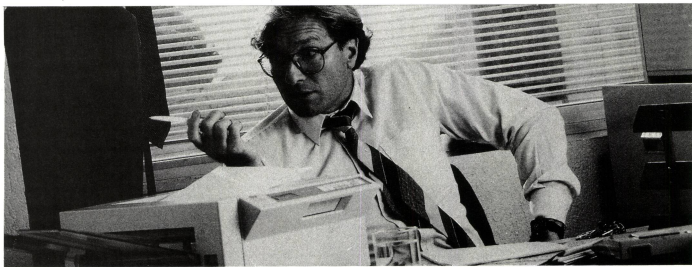
bump and limited transparency and reflection capabilities. Images from 3D Studio have shown up everywhere from TV to computer games. Other programs are capable of the same level of realism. The truth is, low-cost tools can create images every bit as impressive as more expensive systems. And, with a fast 486

computer, there isn't that much difference in speed.

The real limitation of any rendering tool is the creativity of the artist using it. Unlike spreadsheets or accounting programs, rendering programs demand an equal mixture of technical expertise and aesthetic perception. 



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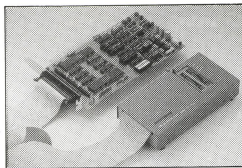
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SPRINTER adds a flexible cursor speed up to your PC

If you can remember the mainframe days, you wouldn't have forgotten the crisp text, excellent function-key layout and unbeatable keyboard feel that made the IBM 3778 terminal such a pleasure to use. The 3778 feature I've missed the most since moving to a PC, however, is the ability to speed up the cursor simply by holding down the Shift key while pressing the cursor movement keys.

SPRINTER.COM is a tiny (1K) terminate-and-stay-resident program that will add this cursor-accelerator feature to your PC. For maximum flexibility, it gives you a choice of Alt, Ctrl or Shift to use as your accelerator key, and it lets you select from among a wide range of speed-up rates. When the accelerator key is held down, the speed step-up is applied to the four Arrow keys and PgUp and PgDn keys.

Like other keyboard-related TSRs, SPRINTER won't work with applications that take over the keyboard interrupt (interrupt 9). Unfortunately, Windows takes over that interrupt when it starts. While it won't hurt to leave SPRINTER installed when Windows is running, SPRINTER will have no effect on Windows applications. SPRINTER can be run in Windows DOS boxes to quicken the cursor in any applications running there, however, provided those programs do not themselves take over interrupt 9. Some DOS applications bypass the BIOS and thus bypass SPRINTER, too. And SPRINTER won't work with WordPerfect's Cursor Speed feature. To prevent problems, I've included a disable/enable switch so you can safely leave SPRINTER loaded and apply it to all programs that can use it.

A copy of SPRINTER.COM is available from our Mag-disk service, telephone (02) 288 9162. For further contact details, see the text box 'How to obtain a copy of SPRINTER' on page 176. You'll need an assembler compatible with Microsoft's MASM 2.0 to construct the executable file from the source.

Using SPRINTER

SPRINTER has six optional command-line parameters. Its complete syntax is

```
SPRINTER [/K xx] [/S n] [/U]
          [/D] [/E] [/?] 
```

By default, SPRINTER is installed and enabled with the Alt key (left or right) as its accelerator key when you run the program at the DOS prompt or in your AUTO-EXEC.BAT file. The **/K xx** switch can be used to change the accelerator as follows:

```
/K S   Either Shift key
/K LS  Left Shift key
/K RS  Right Shift key
/K A   Either Alt key
/K LA  Left Alt key
/K RA  Right Alt key
/K C   Either Control key
/K LC  Left Control key
/K RC  Right Control key
```

Note that the accelerator key choice can be changed after SPRINTER has been loaded. Simply run SPRINTER **/K xx** with the new **xx** value; SPRINTER will find the installed copy of the TSR and change the combination.

The **/S n** option lets you determine the degree to which SPRINTER accelerates the cursor. The speed can be set with values of **n** from 1 to 9, the default being 2. A speed of 9 will almost make the cursor leap across the screen. Like all SPRINTER command options, the acceleration speed can also be reset after SPRINTER has been installed.

The **/D** option temporarily disables SPRINTER. This can be handy when you are running a program incompatible with SPRINTER's direct access to the BIOS keyboard buffer. The **/E** parameter re-enables the utility. The **/U** command uninstalls it. Remember, all TSRs must be removed in reverse of the order in which they were installed. The final command-line option, **/?**, brings up a help screen that describes

The old IBM 3778 mainframe terminal had a handy cursor-accelerator key that PCs never had — until now.



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the proper syntax for each of the command-line parameters.

How SPRINTER works

It will be helpful to begin by reviewing how the keyboard, the keyboard controller and the BIOS work together to pass keystrokes to the system. The PC keyboard consists of a matrix of mechanical switches. Each switch is checked every few milliseconds to see whether anyone has pressed a key, which closes one of the switches. Checking each key to see if it is pressed is a time-consuming process, and if the computer's central processor (the 286, 386 or 486) on the motherboard had to carry out the job, it wouldn't have time to do much else.

For this reason, the task of checking the keys is turned over to an additional microprocessor (called a microcontroller), which is built into the keyboard unit. The keyboard microcontroller is actually a single-chip computer that has its own ROM, RAM and I/O ports. It runs a single, monotonous, unchanging program burned into its ROM that checks each key every few milliseconds. The microcontroller communicates with the PC through the keyboard cable using a serial protocol.

On today's standard keyboard there are over 100 keys, which would suggest that the keyboard microcontroller would need that many I/O lines in order to check each switch individually. Actually, however, the controller can get by with only eight I/O lines.

The keyboard keys are wired in a matrix in which each key is connected to the intersection of a row and a column line. Each switch can thus be addressed (and checked) by selecting its row and column address. The controller I/O is wired so that most of its lines are connected to row and column decoders. A decoder is a chip that takes in a four-bit number and activates one of 16 output lines. After the row address is written, the controller sends each of the column addresses. The keyboard controller spends its life repeatedly scanning each of the keys in this manner. When a key is down, an additional line from the keyboard back to the controller is lowered, and a last I/O line is used to select whether the number from the microcontroller is being sent to the row decoder or the column decoder. (This brief example assumes a generic PC keyboard; the concepts are implemented differently for varying keyboard designs.)

The difference between the mechanical world (in which things are measured in fractions of seconds) and the electrical world (in which things are measured in fractions of microseconds) presents the keyboard controller with an additional task. When a key is pressed, there is always a certain amount of mechanical bounce at the

bottom of the keystroke. While no human would notice it, the keyboard controller is fast enough to register each bounce as a separate keystroke. Since this is obviously not desired, the keyboard controller 'debounces' the keyboard by accepting only key closures that have been held for enough scans that the key has finished bouncing.

The keyboard controller reports the keypress to the system as a scan code that can be read by the system microprocessor. The controller sends at least two codes for every keystroke: a 'make' code when the key is pressed and a 'break' code when it is released. If the key is held down for a preset amount of time (usually about half a second), the controller sends extra make codes (without intervening break codes) to produce the typematic action of the keyboard.

"It certainly seems like overkill to add an extra microcontroller just to flip some lights, but it is rumoured that the original design of the AT keyboard included a small LCD panel that didn't make the final design."

When a scan code is sent to the system, the system microprocessor is interrupted with IRQ1, mapped as interrupt 9h. The system BIOS reads the scan code from the I/O port, matches it to an appropriate ASCII code, and places the scan code/ASCII combination in the BIOS keyboard buffer. If the scan code corresponds to a shift key (Alt, Ctrl or Shift) instead of to a standard key, the scan code is discarded and the BIOS sets the proper bits in the keyboard status byte in the BIOS data area. If the keyboard buffer is full when an interrupt 9 occurs, the BIOS beeps the speaker.

The 32-byte keyboard buffer is located in the BIOS data area in segment 40h. The buffer itself is usually located at offset 1Eh of the BIOS data area. Pointers to the beginning and end of the buffer are kept in locations 80h and 82h, also in the BIOS data segment. Since the keyboard buffer pointers are near pointers (no segment is specified), the buffer can be moved, but it must remain in the BIOS data segment.

The buffer operates on a first in, first out (FIFO) basis. It uses two additional pointers to point to the head and tail of the buffer. The head pointer points to the next scan code to be removed from the queue,

while the tail pointer points to the last scan code placed in the buffer. When these pointers are equal, the buffer is empty. This design results in the keyboard buffer being able to hold a maximum of 15 keys.

While the discussion so far has been about a generic PC, a few model-specific comments are in order. In the original IBM PC, the keyboard controller was located in the keyboard unit and the action took place as described above. When IBM introduced the PC AT, the keyboard interface was radically redesigned.

The AT keyboard interface retained compatibility with established I/O port addresses and scan codes, but it added an additional keyboard controller chip on the motherboard. This added intelligence allowed implementing two-way communication between the system and the keyboard. This is how the shift indicator bits on the AT and PS/2 keyboards can be turned on and off by system command.

The AT interface added a standard set of keyboard controller commands to the keyboard interface. The system could now send commands to the keyboard to perform specific tasks, such as performing a self-test, resending the last code and setting the shift indicator lights. It certainly seems like overkill to add an extra microcontroller just to flip some lights, but it is rumoured that the original design of the AT keyboard included a small LCD panel that didn't make the final design. This proposed LCD may explain the elaborate communications protocol that the AT and subsequent PCs have used ever since.

From hardware to software

When an application program (or DOS) wants to read from the keyboard, it uses the interrupt 16 BIOS' keyboard services. The INT 16 routines allow programs to wait for a key, check whether a key is available, and check the shift state of the keyboard.

When an application wants to read a key, it calls the Keyboard Read Function (INT 16, AH=0). If a key is in the buffer, the call returns with the scan code in AH and the ASCII character in AL. If there is no key in the buffer, the function does not return until a key is available.

One interesting feature of BIOSs since the AT is that before the BIOS enters its loop to wait for a key, it calls the system Wait function (INT 15, AH=0) with BL=2. This notifies the operating system that the current program is waiting for a key and needs no processing time until a key is available. When a key is pressed, the BIOS calls the Post function (INT 15, AH=91) to tell the operating system that a key is now available and that the application should be restarted.

For programs that don't want to wait for

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a key, the Keystroke Status function (INT 16, AH=1) can be used both to indicate whether a key is in the buffer and provide the scan code and ASCII character of the key. Programs that loop on this call waiting for a key should always yield control of the system if a key is not available. A program can yield control by calling the DOS Idle interrupt (INT 28) and by calling the release timeslice call (INT 2F, AX=1680). The release timeslice call originally used in the OS/2 1.x DOS box is also used by Enhanced-mode Windows and OS/2 2.0.

The state of the shift keys can be read by calling the Shift Status function (INT 16, AH=2). This function returns the state of the Shift, Ctrl, Alt, NumLock, CapsLock and ScrollLock keys. The function differentiates between the left and right Shift keys, but does not differentiate between the left and right Ctrl and Alt keys. The extended keyboard functions must be used to determine which Alt or Ctrl key has been pressed.

When IBM created the Enhanced 101 or 102-key keyboard late in the life of the PC AT, new BIOS keyboard functions were added that mapped the original Get Key,

Key Status and Shift Status functions. The Extended Keyboard Read function (INT 16, AH=10) is identical to the Keyboard Read function, except that this new function will return any extended key codes in the keyboard buffer.

SPRINTER shows that while the mainframe terminal was well designed, it is the programmability of the PC that makes it an unbeatable productivity tool.

The Enhanced 101-key keyboard (the one with the extra 'inverted T' cursor keys) added a number of keys to the standard PC keyboard. These new keys are usually mapped to their duplicated counterparts on the standard keyboard. For example, the Enter key on the keypad of the Enhanced keyboard is normally indistinguishable

from the Enter key next to the letter keys. The two Enter keys can be differentiated by using the Enhanced Keyboard Read function, if desired.

When one of the new keys is pressed, the keyboard controller sends two scan codes. An E0h extended scan code is sent first, immediately followed by the old scan code corresponding to the matching key on the old keyboard. The keyboard BIOS translates this 2-byte scan code by using the same ASCII equivalent, with an E0 replacing the old scan code used on the AT keyboard. For example, the regular Enter key scan code is 1C, which would be represented in the keyboard buffer as 1C0D (the scan code combined with the ASCII carriage-return code). If the number-pad Enter key is pressed, the controller sends the 2-byte scan code E01C, which is represented in the keyboard buffer as E00D. When an application uses the standard Read Keyboard function (AH=0), the BIOS automatically translates the E00D key code in the key buffer to 1C0D in order to remain compatible with the old AT keyboard. To return the true E00D scan code, the Enhanced Keyboard Read function would have to be used.

As indicated above, the Extended Shift Status function (INT 16, AH=12) lets applications determine whether the left or the right Alt or Ctrl key was pressed. The function returns an extended shift status in AH to complement the standard shift-status byte in AL. The extended shift status also allows applications to use the SysReq key as a Shift key, since its shift status is also returned in AH.

Some seldomly used BIOS keyboard functions are not supported on all machines. For example, the Set Typematic Rate functions (INT 16, AH=3) are supposed to allow applications to adjust the typematic settings of the keyboard. Originally introduced on the PCjr, this function has several subfunctions designed to set and read the typematic rate.

Unfortunately, this function is supported only on a limited set of systems. To determine whether the function is supported, an application should call the Keyboard Functionality Determination function (INT 16, AH=9). This function returns a status byte in AL that indicates which of the set-and-read typematic functions are supported. Ironically, like the typematic functions themselves, this function is only supported on a limited set of machines. To determine if this function is supported, the Return System Configuration Parameters function (INT 15, AH=C0) must be used. (It would seem that the IBM BIOS designers had some time on their hands when they were adding functions to the original AT BIOS!)

A potentially useful function, Keyboard

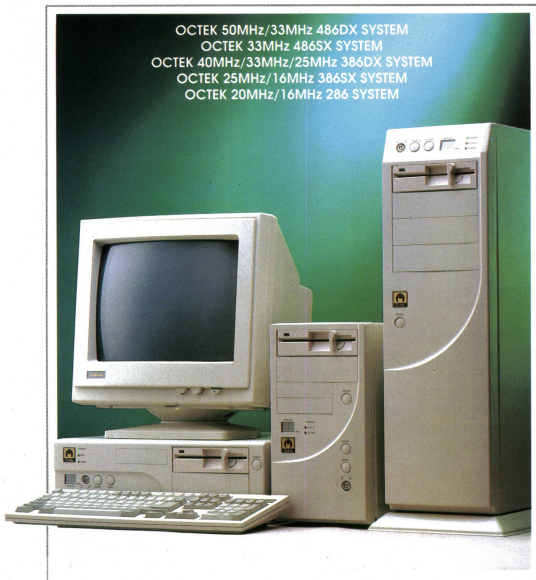
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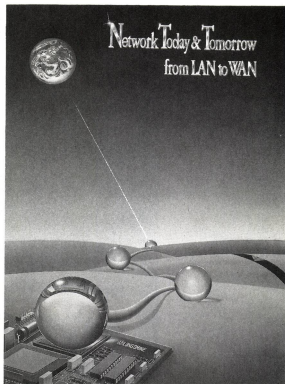
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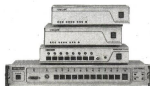
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Write (INT 16, AH=5), lets applications insert a scan code into the keyboard buffer as if it had been typed on the keyboard. Unfortunately, this function was included only in the AT BIOSs dated after November 1985. Since it's not always available, most applications (including SPRINTER) write to the keyboard buffer directly to stuff a key.

The SPRINTER code

SPRINTER works by intercepting both the Timer (INT 8) and Keyboard (INT 9) interrupts. In a nutshell, SPRINTER detects the proper shift conditions, sets a flag and lets the timer interrupt push extra scan-code combinations into the keyboard buffer.

The SPRINTER keyboard interrupt routine reads the scan codes directly from the keyboard I/O port 60h. If the key matches either the PgUp, PgDn or Arrow keys, and if the code is a make code, the scan code is stored. If the scan code is a break code, the stored scan code is cleared.

If the scan code corresponds to any of the shift keys, it is converted into a bit flag that corresponds to the bits in a shift-status byte kept inside SPRINTER. Again, if the code is a make code, the bit corresponding to the shift key is set; otherwise the bit is cleared.

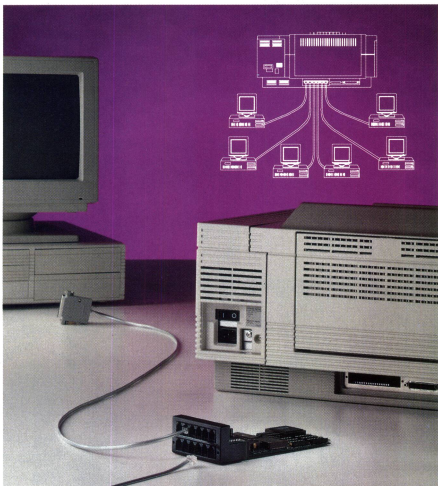
If one of the cursor keys is detected while the correct shift key is pressed, the interrupt routine resets the interrupt controller and performs an IRET instead of passing control to the BIOS routine. This prevents programs that use that shift-cursor combination from performing other actions. If a cursor key is pressed after the shift key, then neither the cursor nor the shift scan code is discarded. The timer interrupt routine looks to see whether the proper shift combination is pressed along with a cursor key. If it is, the timer routine stuffs the proper scan code into the keyboard buffer the number of times indicated by the keyboard speed parameter. The frequency of the timer interrupt (18.2 times per second) multiplied by the key speed parameter permits an accelerated keystroke rate from 18 to 163 keys per second.

The installation and removal of SPRINTER follows standard TSR procedures. The program finds itself in memory by performing a compare of the first 16 words of every segment. To ensure that the search doesn't stumble across an image of the program in a disk buffer, the first word of the program is zeroed before the search begins.

SPRINTER shows that while the mainframe terminal was well designed, it is the programmability of the PC that makes it an unbeatable productivity tool. The days of the time-share terminal have drawn to a close, but that doesn't mean you have to lose all the desirable features that went with the territory. ☺

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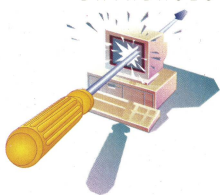


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DATABASES

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Using BROWSE in lieu of pick lists in dBASE IV

Unfortunately, dBASE IV 1.1 does not allow multiple fields in pick lists, nor can pick lists be edited on the fly. Although the BROWSE command can be used to simulate a pick list, offering multiple fields and editability, the inability to exit such a simulated pick list with the intuitive Enter key has long hindered programmers from using this method.

Below is an improved method of using the BROWSE command in lieu of a pick list. With this method, the Enter key exits (and save changes in) the BROWSED database.

The code fragment shown below involves a database of subscribers containing first-name and last-name fields. It defines a window and reassigns the Enter key to send a Ctrl-End keystroke. It displays two editable fields of the database and allows the user to exit simply by pressing the Enter key.

```
USE SUBSCRIB ORDER Lname
DEFINE WINDOW Subwind
FROM 8,1 TO 20,40
ON KEY LABEL Ctrl-M
KEYBOARD CHR(23)
BROWSE FIELDS Lname, Fname
NOFOLLOW NODELETE
NOAPPEND WINDOW Subwind
DEACTIVATE WINDOW Subwind
ON KEY LABEL Ctrl-M
```

Note that it's necessary to restore the original key assignment of the Enter key after the user has exited the BROWSED database.

J Skibbe



There's no doubt that it's much easier to select from a pop-up list than to type in your choice manually. The DEFINE POPUP command has an option that lets you display the contents of a single field, but if you want more than one field, or if you want to allow editing of the data, a BROWSE is certainly the way to go.

Normally, a BROWSE can be terminated using either Ctrl-End or Esc. In a popped-up pick list, letting the user simply move the cursor to the appropriate choice and press the Enter key is far more intuitive.

In order to let the user do this, you must intercept the Enter keystroke and have it feed Ctrl-End to BROWSE instead, since BROWSE needs a Ctrl-End—not an Enter—to exit. This way, the BROWSE will terminate normally and the database will be positioned at the record selected by the user.

In dBASE, Ctrl-M is the label for the Enter key, and CHR(23) corresponds to Ctrl-End, so the statement

```
ON KEY LABEL Ctrl-M
KEYBOARD CHR(23)
```


redefines the Enter key to send a Ctrl-End to the BROWSE. Of course, as soon as the BROWSE terminates, you must remember to change the Enter key back to normal. This is accomplished by the following line:

ON KEY LABEL Ctrl-M

By not specifying anything after Ctrl-M, you instruct dBASE to restore Ctrl-M to its default setting. Most uses for a pick list are read-only in nature.

In most circumstances, you want to offer the user a choice, but not the ability to change the choices. The NOEDIT option can be used on the BROWSE command to prevent any changes to the information shown by the BROWSE, making the pick list read-only — *Sal Ricciardi*.

Using tone to delay in database programs

I thought you might like to know about an easy way to create a delay in your database programs, at least in Clipper 5.0. The DELAY() UDF that follows is based on the fact that the Clipper function TONE() takes two parameters: the fre-

quency of the sound; and the duration of the sound in timer ticks. While the normal purpose of TONE() is to produce sound, since frequencies below 20 hertz (cycles per second) are inaudible to the human

... every dBASE-like product should have a built-in, tightly written delay function that delays in timer ticks. You shouldn't have to resort to using the TONE() function ...

ear but can still be entered, you can produce an inaudible sound for the desired interval.

Here's the function:

```
FUNCTION DELAY(nTicks)
  TONE(0, nTicks)
RETURN NIL
```

where *nTicks* represents the number of timer ticks to use for the delay. Remember that 18.2 ticks represents approximately one second. I'm sure that there are some other people who have also discovered this neat little trick, but I thought I'd pass it along anyway.

P Beretta



Thanks for the tip. Not only was I unaware of this use of the TONE() function, but so was

my Nantucket contact. Using the TONE() function in this manner indeed works to simulate a clock-tick delay function. It's still unfortunate, however, that Nantucket doesn't provide what Clipper should have had all along: its own honest-to-goodness, built-in delay function. In fact, every dBASE-like product should have a built-in, tightly written delay function that delays in timer ticks. You shouldn't have to resort to using the TONE() function, which was clearly intended for another purpose.

But I'll save my gripes for another time. In the meantime, users of Clipper, Summer 87, will find that the user-defined DELAY() function shown above works there as well — *Sal Ricciardi*.

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SPREADSHEETS

Excel database print areas

I like to use Microsoft Excel for simple database applications, but I sometimes forget to update my print range after adding new records. Rather than making printouts that don't include the latest records, I link my Print_Area and Database ranges so that they always stay in sync. I use Excel's Formula Define Name command and assign the following formula to the name Print_Area:

```
= $E$2:INDEX(DATABASE,ROWS  
(DATABASE),COLUMNS(DATABASE))
```

This assumes that my Database range starts at E1. I leave the top row of the database out of the Print_Area range because that row is used as my Print_Titles range. If I included it (by setting Print_Area equal to Database), then my titles would be printed twice on each page.

R Preston



If you use Excel's Form command to add new records to a database, the definition of the Database range automatically expands to include the new records, saving you the trouble of returning to the Define Name dialogue box. Unfortunately, Excel will not automatically expand the range named Print_Area. One way you can avoid the mismatch of Print_Area and Database is simply by devoting your entire worksheet to the database and never defining a print area. If you never create a range named Print_Area, Excel always prints the entire populated area of your worksheet.

Mr Preston's use of the INDEX() function in the Define Name dialogue's Refers to box is a more generally applicable solution. You can make his solution even more general by using INDEX() at both ends of the reference. The formula

```
=INDEX(DATABASE,2,1):INDEX  
(DATABASE,ROWS(DATABASE),COLUMNS  
(DATABASE))
```

relieves you of the need to hard-code the upper-left corner of the print region.

A simpler formula that works almost perfectly is =OFFSET(DATABASE,1,0). The reference returned by this formula

has the same size and shape as the range named Database, but starts at Database's second row. If you don't mind including an extra blank row at the end of your printouts, this alternative works well — *Craig Stinson.*

Setting WYSIWYG printer defaults

Many users who have recently installed Lotus 1-2-3 Release 2.3 experience problems printing from the WYSIWYG add-in. Some of these problems occur because a printer hasn't been selected when the user chooses the :Print Go command. Before printing, the user must choose the :Print Config Printer command and pick from the list of installed printers.

When you first install WYSIWYG, you can specify all the printers you expect to be using. But the installation program does not actually select the printer with which you'll print. You have to make this selection manually after you begin using WYSIWYG.

When you save a new worksheet after choosing a printer, WYSIWYG saves the selected printer along with the worksheet and formatting data. Unfortunately, this information is lost when you start a new worksheet at your next session.

Fortunately, there is a way to record a printer selection for all newly created worksheet files. To do this, you must update the WYSIWYG configuration file, WYSIWYG.CNF, which stores all the default settings that Lotus 1-2-3 uses when you attach the add-in. This update command, however, is not located in a place where you would expect to find it.

The :Print menu has no Update command, but the :Display does. Choosing :Display Default Update writes all the current default settings, including the default printer selection, to the WYSIWYG.CNF file. So if you want WYSIWYG to assign a particular printer to all newly created worksheets, you must first use :Print Config Printer to specify which printer, then :Default Display Update to record your choice.

J De Carli



Mr De Carli is right. Most of the settings stored in WYSIWYG.CNF have to do with the appearance of your screen, but this configuration file also records your default

printer. Unless you explicitly put a printer choice into this file in the manner described by Mr De Carli, WYSIWYG will play dumb at the beginning of each working session. If you have had trouble discovering that you have to use :Display Default Update to register your favourite printer, one can hardly blame you.

For more details about the information recorded in WYSIWYG.CNF, see the bullet list on page 281 of the Release 2.3 user guide — *Craig Stinson.*

Quick access to functions

Here's a keyboard shortcut for entering functions or advanced macro commands in Lotus 1-2-3 for Windows (1-2-3/W). Start by typing @ (for a function) or ! (for a macro command). Then press the Name key, F3. Lotus 1-2-3/W will display a list box of all the available functions or macro commands. Then press Tab once, followed by the first letter of the function or macro command you want to use. The program will respond by taking you to the next item in the list that begins with the letter you pressed. From there, you can easily find the function or command you want and press Return to enter that name on the command line.

D Roche



Nearly all list boxes in all Windows dialogue boxes function in the manner Mr Roche describes. Pressing any letter takes you to the next item in the list that starts with that letter. For example, in the 1-2-3/W Functions list box, pressing C once would select CELL; pressing C a second time would highlight CELLPOINTER. Further presses would take you to CHAR, CHOOSE, CLEAN and so on.

When you press the F3 key after typing an @ sign or !, 1-2-3/W displays a dialogue box consisting of an edit line and a list box. To access the list, so you can use the first-letter search method to find the item you want, you have to press Tab or click on the list with the mouse.

Lotus 1-2-3/W also includes an optional SmartIcon that will enter the @ for you and take you straight to the functions dialogue box. You can add this icon to your SmartIcon palette by choosing the Tools SmartIcons command and clicking

the Customise button. Then select the @ icon (in the Standard icons gallery) and click the Add button. If you're using 1-2-3/W on a standard VGA display (480 by 640 pixels), you'll probably want to delete one Smarticon from the default palette to make room for the newcomer. You can do that by choosing the Tools Smarticons command, clicking the Customise button, selecting the icon you want to unload, and then clicking the Remove button — *Craig Stinson*.

A Lotus 1-2-3-like Excel histogram feature

Having used Lotus 1-2-3 to create histograms, I thought that perhaps duplicating the way the Lotus /Data Distribution command works may help those who are more familiar with that interface. Also, I think the ability to choose a distribution range is valuable when you want unevenly spaced intervals, or when they are not placed in the column next to your data.

I wrote the macro HISTOGRM.XLM, listed in Fig 1. When you run the code in A1, a Histogram command appears on the worksheet menu bar's Data menu. This command prompts for an input range and a distribution range, just as 1-2-3's /Data Distribution does. The macro then inserts all the correct array formulae and converts them to constants, as you did in your macro. When you create this macro, assign the name HISTOMACRO to cell A7.

D Paradi



The absence of a simple histogram command in Excel has been a long-standing irritant to many Excel users. Excel 4.0 will finally erase that shortcoming. The upgrade's Analysis Toolpak includes both a Histogram command and a FREQUENCY function. The Histogram command will let you specify an unevenly spaced set of distribution bins and will also give you the options of sorting the output, calculating cumulative percentages and generating an attractively formatted chart.

The Histogram command creates a set of constants rather than formulae. If you want the results linked to input values, so that when the values change, the analysis stays current, you can use the FREQUENCY function. To use it, select the entire area where you want your output to appear, and type the formula

=FREQUENCY(input_range,bin_range)

where input_range is the column of data to be analysed and bin_range contains the distribution intervals. Finally, enter the formula as an array by pressing Ctrl-Shift-Enter.

If you stay with Excel 3.0, Mr Paradi's HISTOGRM.XLM will do the job just fine. And if, in addition to naming A7 HISTOMACRO, you define the cell as a command macro and then give it a keyboard shortcut, you can invoke the procedure by

typing something simple and obvious, such as Ctrl-H.

Each of the array formulae built by the loop in A15:A18 examine a pair of logical expressions: 'Is the current value greater than or equal to some value' and 'Is the current value less than some other value'. When both expressions are true, the array tallies a 1; when either is false, it tallies a 0. The SUM function, which embraces the two logical expressions, counts the number of 1s and deposits the result in the current histogram bin.

If you want the macro to leave its array formulae in place rather than converting the results to constants, insert new cells in A20:B20 and bump the rest of the macro down. Then type =RETURN() in A20. And if you want Mr Paradi's Histogram command to automatically appear on the Data menu whenever the macro sheet is loaded, assign the name Auto_open to cell A1.

Neither Mr Paradi's macro nor the Excel 4.0 Histogram will come anywhere close to the blinding speed of Lotus 1-2-3 2.x's /Data Distribution command, which runs in machine language, but they are respectably quick nonetheless. The Analysis Toolpak's Histogram command in Excel 4.0 appears to operate in about 30 per cent less time than Mr Paradi's macro (it could actually be faster than that, judging from an early beta build), so if speed is critical or you have a large range of data to analyse, you'll probably want to use Excel 4.0 — *Craig Stinson*.

HISTOGRM.XLM

	A	B
1	=ADD.COMMAND(1,"Data",A3:B4)	
2	=RETURN()	
3	-	
4	&Histogram	histomacro
5		
6		
7	=DEFINE.NAME("da_ta","INPUT("Select Data Range","A","Data Range Selection"))	
8	=IF(GET.NAME("da_ta")="FALSE",RETURN())	get range of values
9	=DEFINE.NAME("distrib","INPUT("Select Distribution Range","A","Distribution Range Selection"))	end if Cancel
10	=IF(GET.NAME("distrib")="FALSE",RETURN())	get range of distribution intervals
11	=SELECT(I(distrib))	end if Cancel
12	=SELECT(I("1"))	position to first row
13	=FORMULA.ARRAY("=sum((da_ta<=rc[-1])*(1"))")	position to output range
14	=SELECT("r1")	
15	=FOR("x",1,ROWS(distrib)-1,1)	for loop
16	=FORMULA.ARRAY("=sum((da_ta<=r[-1])*(da_ta<=rc[-1]))")	enter formula
17	=SELECT("r1")	next row
18	=NEXT()	
19	=FORMULA.ARRAY("=sum((da_ta<=r[-1])*(1"))")	add over upper limit
20	=SELECT(I(distrib))	
21	=SELECT(OFFSET(SELECT(I),0,1,ROWS(distrib)+1))	select the output
22	=COPY()	convert to values from formulas
23	=PASTE.SPECIAL(3)	
24	=CANCEL.COPY()	cancel copy
25	=RETURN()	end

Fig 1 This macro adds a Histogram choice to Excel's Data menu, which prompts you for a value range and then for an interval range, just as does the built-in feature in Lotus 1-2-3

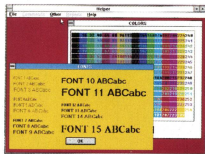
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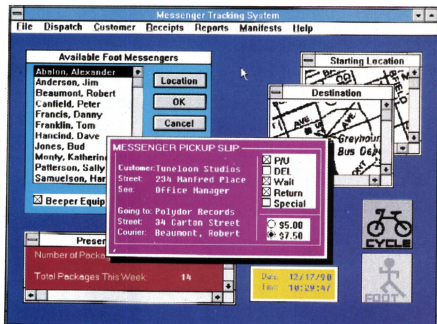


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WORD PROCESSING

Hyphens in WordPerfect

Program listings and downloads from bulletin boards often include a lot of hyphens. If you retrieve this straight-ASCII text into WordPerfect (in both Versions 5.0 and 5.1, using Shift-F10 or using F5 to see a list of files and then choosing Retrieve), trying to work with these hyphens can be annoying.

The characters show onscreen as hyphens, but that is not the whole story. If you save the document and then look at it in hex format with DEBUG or the equivalent, you'll see that the characters are stored as ASCII character 2D hexadecimal, or 45 decimal. To look at the document with DEBUG, enter

DEBUG filename

at the DOS command line. Then use the D command at the DEBUG prompt (which, coincidentally, appears as a hyphen) to dump the file to the screen piece by piece in hex format. But if you try searching for or replacing these hyphens in WordPerfect by pressing the Hyphen key, the program can't find them. Nor can WordPerfect find the hyphens if you enter the search string by holding the Alt key down, entering 45, and releasing the Alt key to enter the ASCII value for a hyphen.

If you use DEBUG to look at a document that includes hyphens created by typing the Hyphen key from within WordPerfect, you'll find that WordPerfect uses the ASCII character A9 hex, or decimal 169, not ASCII 45 to represent this kind of hyphen.

This explains why WordPerfect can't find the hyphens it has imported from other applications, but it doesn't help find them with

a search or search-and-replace command. The solution is to use the import DOS Text feature importing the file by choosing Ctrl-F5, then DOS Text, then Retrieve (CR/LF to [SR]) in HZone). When WordPerfect imports the text with this option, it will also convert any ASCII 45 characters to ASCII 169. Note that if you choose the Retrieve (CR/LF to [HRT]) option, WordPerfect will not convert the characters.

B Veerman



These comments are absolutely correct as far as they go. (As a matter of fact, they apply to WordPerfect Version 4.2 also, though with Version 4.2, you choose the DOS text retrieve option in one step rather than two.) The actual situation, however, is just a bit more complicated. WordPerfect recognises three different kinds of hyphens: the hyphen character, the hard hyphen and the soft hyphen.

The hyphen character and the hard hyphen are always visible on the standard editing screen. The difference between the two is that the hyphen character indicates an acceptable position for a line break, while the hard hyphen does not. Hard hyphens are only meant for 'words' like 1-2-3, where you don't want a line break. The soft hyphen indicates an acceptable position for a line break, but only prints or shows on the standard editing screen when the word is hyphenated at the end of a line.

WordPerfect uses ASCII 169 (A9 hex) for the hyphen character (entered by typing the Hyphen key), ASCII 45 (2D hex) for the hard hyphen (entered by hitting the Home key,

followed by the Hyphen key), and ASCII 172 (AC hex) for the soft hyphen (entered by holding down the Ctrl key while pressing the Hyphen key). That means you can search for or replace any of these characters, as long as you know which kind you're looking for. Simply enter the appropriate kind of hyphen in the search string, using WordPerfect's usual keystrokes — hyphen, or Home then Hyphen, or Ctrl-Hyphen, as appropriate.

Although all three kinds of hyphens look exactly the same when you view them on the standard editing screen, they appear differently when you enter them in the search string or view them with the Reveal Codes. The hyphen character will appear in boldface, as [H], the soft hyphen as a boldfaced -, and the hard hyphen will appear as a non -.

WordPerfect for Windows differs slightly from WordPerfect for DOS in keystrokes and terminology. WordPerfect for Windows calls the hyphen character a regular hyphen and the hard hyphen a dash, though both types of hyphens use the same ASCII characters as their equivalents in WordPerfect for DOS and behave the same way.

DOS WordPerfect users who are planning to move to WordPerfect for Windows also need to know that the hard hyphen, or dash, is entered with Ctrl-Hyphen in the Windows version, not Home, Hyphen. The soft hyphen is entered by typing Ctrl-Shift-Hyphen. Also, the Reveal Codes screen uses shading rather than boldface to indicate codes. Otherwise, the different kinds of hyphens function much the same way in both DOS and Windows versions — *David Stone*.

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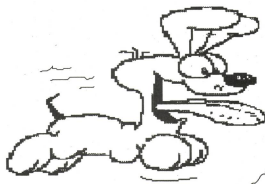
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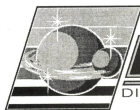
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WINDOWS

Quick-reference cards

I'd like to pass on a simple tip for producing a tailorable quick-reference card for function keys and similar lists in the Windows environment. For example, Microsoft Excel's Help contains a list of function keys in the Keyboard section. Choose Edit Copy to get the section to the Clipboard, paste it back into an Excel spreadsheet, format it to taste and print it.

D Jobling



The ability of the Windows Help application to copy help pages to the Clipboard makes this tip possible. Help copies the text of the help page onto the Clipboard, from which you can paste it into any number of applications. Because the Excel Function Keys help page is laid out in a columnar fashion, the text is placed onto the Clipboard as tab-delimited fields. The text can therefore be pasted into Excel cells very neatly. Formatting is a snap, as you can see in Fig 1. This technique should also produce satisfactory results with other Windows applications' help pages.

For full-screen DOS programs, the Print Screen key can be used to copy the screen contents to the Clipboard. Once you are back in Windows, you can paste the textual contents into Excel, the Notepad, or any number of applications — *Fran Finnegan*.

The DOS environment

Please clarify a term used in many articles published on Microsoft Windows. I have read references to increasing the 'DOS environment', searched the Windows manual and glossary, and reviewed the sections on PIFs; I found no reference to the DOS environment. Can you be more specific on what it means and how it relates to UAEs?

J Emerson



The DOS environment is an area of memory that DOS sets aside to hold variables that specify your computing environment. For example, the DOS PATH and PROMPT commands store their information in the environment. But even though the environ-

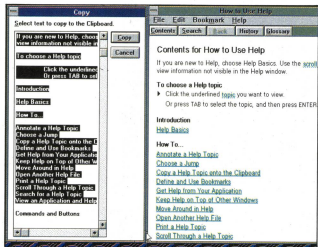


Fig 1 Help text can be copied to Windows' Internal Clipboard and then pasted into Excel or other applications for formatting

ment is part of DOS, you may still get UAEs if it is not large enough for Windows' UAEs.

Whenever you run any application under Windows, be it a Windows application, a DOS application, or COMMAND.COM itself, Windows passes the application a copy of the DOS environment. This copy starts with whatever variables were present in the environment when you first loaded Windows; then Windows adds some specialised information. You can see one of

keep your environment large enough that at least 128 bytes of it are always empty.

To determine how much of the environment you have used so far, you can enter this command at any DOS prompt:

```
set> env.txt
```

which creates a file named ENV.TXT that will contain the contents of your environment. If you then enter

```
dir env.txt
```

you can see approximately how much of your environment is used by noting the file size of ENV.TXT. From there, ENV.TXT can be deleted.

The default size for the environment is 128 bytes in DOS 3.2 and earlier, 160 bytes in DOS Versions 3.3 to 4.01, and 256 bytes in DOS 5.0. However, you can change the environment size using the /E: switch on the SHELL= line in your CONFIG.SYS file. If you don't have a SHELL= line, create one, like this:

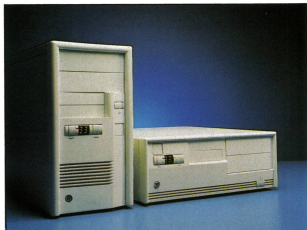
```
SHELL=C:\DOS\COMMAND.COM C:\DOS /E:1024 /P
```

If your COMMAND.COM is not in the directory C:\DOS, change the two occurrences of that directory to the one you actually use. The line above sets a 1024-byte environment. If you're working in DOS 3.1, you must use the number of 16-byte paragraphs, not the number of bytes. DOS versions prior to 3.1 don't support the /E: switch, but Windows 3.x won't run under those DOS versions anyway — *Fran Finnegan*.

•The DOS environment is an area of memory that DOS sets aside to hold variables that specify your computing environment.•

the things it adds (a variable named **windir**) by entering the SET command in a DOS shell under Windows; the rest of what is added (some information that is passed to the application's start-up code) is hidden, so you can't see it with the SET command. If there's not enough free space in the environment for the information that Windows needs to pass to the application, then you may get UAEs. But this depends on whether or not the start-up code of a particular application is sensitive to the information that Windows cannot fit into the remaining free environment space. To avoid this problem,

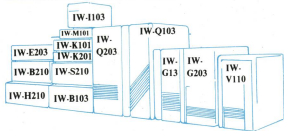
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PROGRAMMING

Reducing program size

It's no secret that standard C library functions like `printf` can add about 2K to your executable program's size. I've long resigned myself to including `printf` in my programs (along with its cousin, `sprintf`); it's just so convenient. But they're not the only functions that can add significantly to your program's size: how about the standard time and date functions?

For instance, try adding a call to the time function or calls to both the time and `ctime`

functions to your program. If your compiler is Microsoft C, your .EXE will jump by about 2K; with Borland C++ the program will grow by 4K. That's because the standard time and date functions pull in a lot of additional functionality that's not really needed in many programs.

To generate the current date and time in a formatted string, you would use the following:

```
#include <time.h>
#include <stdio.h>
```

```
time_t t;
t = time(NULL);
printf("ctime(%t));
```

This would display, for instance,

```
Wednesday, February 12, 1992,
3:41:36.63pm
```

I wrote a function, `GetDateTime`, that does the same thing but keeps your program far smaller. `GetDateTime` works by calling the DOS Int 21h service routines to obtain

DATETIME.C

COMPLETE LISTING

```
// datetime.c RHS 15/1/92

#include<stdio.h>

#if !defined(TRUE)
#define TRUE 1
#endif

#if !defined(FALSE)
#define FALSE 0
#endif

#if defined (SMALL)

void GetDateTime(char *buf)
{
    char *days[7] =
    {
        "Sunday", "Monday", "Tuesday", "Wednesday",
        "Thursday", "Friday", "Saturday"
    };
    char *months[12] = {
        "January", "February", "March", "April",
        "May", "June", "July", "August", "September",
        "October", "November", "December"
    };

    unsigned char day, month, dow;
    unsigned char hour, minutes, seconds, hundredths;
    unsigned char pm = FALSE;
    unsigned year;

    #if defined(_BORLANDC_)
        _AH = 0x2A;
        asm int 0x21;
        dow = _AL;
        year = _CX;
        month = _DH;
        day = _DL;
        _AH = 0x2C;
        asm int 0x21;
        hour = _CH;
        minutes = _CL;
        seconds = _DH;
        hundredths = _DL;
    #else
        _asm mov ah,0x2a
        _asm int 21h
    #endif

    _asm mov dow,al
    _asm mov year,cx
    _asm mov month,dh
    _asm mov day,d1
    _asm mov ah,0x2c
    _asm int 21h
    _asm mov hour,ch
    _asm mov minutes,cl
    _asm mov seconds,dh
    _asm mov hundredths,d1
}

if(hour > 12)
{
    pm = TRUE;
    hour -= 12;
}

if(!hour)
    hour = 12;

sprintf(buf,"%s, %s, %d, %04d, %d:%02d:%02d.
%02ds", days[dow],months[month-1],day,year,
hour,minutes,seconds,hundredths,(pm ? "pm"
) : "am"));

#elif defined(BIG)

#include <time.h>
void GetDateTime(char *buf)
{
    time_t t;

    t = time(NULL);
    sprintf(buf,"%s",ctime(&t));
}

#else
#error You must define SMALL or BIG in the
program or on the command-line!
#endif

void main(void)
{
    char buf[50];

    GetDateTime(buf);
    printf("%s\n",buf);
}
```

Fig 1 This program shows how to keep your program smaller by using a homegrown function rather than standard library routines to generate date-time strings

the system date and time. It uses inline assembler to set up these calls, and then calls `sprintf` to format the date-time string in a buffer passed to `GetDateTime` by the calling program. While including `sprintf` or one of its variants will, of course, add code to your program, it won't matter if you've already included it. Unlike the output of `ctime`, `GetDateTime` uses a standard 12-hour (rather than 24-hour) designation and adds 'am' or 'pm' to the date-time string.

To show you how `GetDateTime` works and why homegrown functions like this are valuable, I wrote a small program, `DATETIME.C`, shown in Fig 1. `DATETIME.C` uses both the `time/ctime` and `GetDateTime` approaches to generating a date-time string. The two are segregated via compilation controls: you define `BIG` in the program or on the command line to use the `time/ctime` approach, or define `SMALL` to use `GetDateTime` (you'll generate a compiler error if you don't define one or the other).

Thus, to compile `DATETIME` to use `GetDateTime` with Microsoft C 6.0 or 7.0, use

CL -DSMALL datetime.c

DATETIME.EXE'S SIZE

Compiler	Using <code>GetDateTime</code> (SMALL defined)	Using <code>time/ctime</code> (BIG defined)	Difference
Microsoft C 6.0	6397	8817	2420
Microsoft C/C++ 7.0	7207	9337	2130
Borland C++ 2.0	6632	11,494	4862
Borland C++ 3.0	7012	11,690	4678

- All sizes in bytes
- All default compilation options used, with the exception of -DSMALL or -DBIG

Fig 2 This table shows how the size of `DATETIME.EXE` varies, depending on whether the `GetDateTime` function or the more traditional `time/ctime` approach is used

And to compile with Borland C++ 2.0 or 3.0, use

BCC -DSMALL datetime.c

Just how much smaller will a program be if it uses `GetDateTime` instead of the traditional `time/ctime` approach? The table in Fig 2 shows the sizes of `DATETIME.EXE` when

compiled with any of the compilers mentioned above. As you can see, the smallest difference in size is 2130 bytes, when you compile with Microsoft C/C++ 7.0. And when you compile with Borland C++ 2.0, the difference is a whopping 4862 bytes! So don't discount the value of rolling your own — especially when it comes to date and time functions — *Richard Hale Shaw*.



CONNECTIVITY

Folio helps manage E-mail pack rats

The toughest problem I face as a NetWare network administrator comes from people who squirrel away their old electronic-mail messages. We started limiting the amount of space for message storage on the server, so now they keep old E-mail files on their local hard disks and put applications on the network. Some users store the same messages in different sub-directories so they can find them when they want them. Is there anything I can offer these people that will reduce the size of their E-mail files while still helping them find what they need?

W Johnson



The good news is that you seem to have a group of people who find value in your E-mail system. The bad news is that those old E-mail files can occupy a lot of expensive storage space. Sydney-based Scantext, tel (02) 261 4511, has a product called Folio MailBag that archives, compresses and

retrieves E-mail messages on NetWare LANs. Out of the box, it works with popular E-mail systems like Action Technologies' The Coordinator, DaVinci eMail, Lotus' cc-Mail, Microsoft Mail and WordPerfect Office. MailBag can also be customised to work with other E-mail programs.

• Using MailBag . . . Instead of occupying space in many different sub-directories, the messages are compressed, easy to find and easy to edit. •

As part of the installation, you create a special .COM file shell routine with the same name as your E-mail's .EXE file. When you enter the name of the program on the command line, the .COM file runs first and starts the .EXE file. MailBag's .COM file intercepts the Ctrl-A keystroke

and sends the appropriate keystrokes to the .EXE file, telling it to archive the message you select. The E-mail program thinks it's sending the message to its own archive, but it's really sending that message to MailBag.

If you've ever used the NetWare HELP utility, you've used a Folio product. Folio Views serves as the text search engine and viewer provided by Novell in every box of NetWare 2.x and 3.x. When you archive E-mail messages with MailBag, the program adds them to an infobase that you can easily search and read with NetWare's Folio Views. The infobase indexes every word and categorises the E-mail by date, sender and topic. You can use Views to search for specific words quickly. Use wildcards and Views will even show you the closest match.

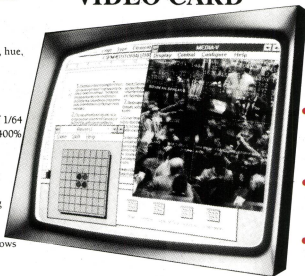
Using MailBag, each person creates a password-protected infobase of archived mail on the server. Instead of occupying space in many different sub-directories, the messages are compressed, easy to find and easy to edit. Folio can sell MailBag for the low price of \$295 for 25 users because Novell already provides the viewing engine — *Frank Derfler*.

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Share protocols with ODI

My Novell NetWare 2.2 workstation shell (NETX.COM) works fine with MS-DOS 3.31, but when I installed MS-DOS 5.0 on my hard disk and tried to boot to the network, my Compaq Deskpro 286 hung and required re-booting. At first I thought the IPX driver I was using for the IBM Token Ring adaptor might be conflicting with the HIMEM.SYS memory manager device driver, so I removed from the CONFIG.SYS file all environment variables except files=30 and buffers=30. My machine still locked up. I've had to stay with MS-DOS 3.31 to be able to access the network. What's the problem?

L Simpson



You did not say what revision levels of IPX and NETX you were using. Using the latest versions, available through Novell's NetWare service on CompuServe, should eliminate the problem you experienced. Alternatively, we recommend using Novell's new ODI 'stack'. ODI stands for Open Data-Link Interface. IPX.COM is a dedicated driver created with WSGEN that only works with the IPX protocol, but the ODI stack is a more general protocol interface. The ODI drivers support additional protocols by providing a standard interface that lets multiple transport layer protocols simultaneously share a single network board without conflict. While you may not need the additional functionality in the ODI driver set, the ODI set may solve your problem. Replace your IPX entry in the AUTOEXEC.BAT with three entries: LSL, TOKEN and IPX-ODI before you execute NETX — Alan Frank.

Solving SMC problems

I'm using Standard Microsystems' Ethernet 10BaseT adaptors on a newly installed Novell network. I originally had a server running NetWare 2.15, which I upgraded to NetWare 2.2. I can no longer log in. When I type in IPX and then NET5, my cursor hangs without giving me a full login. How can I solve this problem?

D McLaren



There have been reports of problems associated with the SMC 10BaseT card and its driver. Similar problems are known to occur on both the SMC 3008 and 3016 10BaseT drivers. New ones are available from SMC or on Novell. You might check the date of your 10BaseT driver. If it's older than the most recent ones available,

you should get the upgrade from SMC or Novell — Alan Frank.

NetWare security

Our office is running NetWare 3.11 and has had various security violations. Do you have any recommendations for guarding against this?

A Ridgway



The term 'security violations' is too general to give precise advice. There are a number of solutions, depending on the type of security violation. Securing your network consists of the following steps:

- Using common sense
- Using all of the supervisor safeguards built into network operating systems
- Adding third-party devices for extra protection if a risk/exposure evaluation indicates this is necessary.

Assuming the risk/exposure evaluation has proved that you have problems, we'll

“Scanners are a useful first line of defense against viruses, but don't rely on them entirely.”

discuss various third-party devices that deal with audit, access control, viruses and established policies.

Auditing software keeps a log of various types of user activities. Activities it watched for may include reading or writing files, logging in, changing the NetWare bindery and application-defined security violations such as password guessing.

Auditing software supplements NetWare security by furnishing a more comprehensive history of user activities than required for accounting. It monitors events such as logins, logouts and file activities at every workstation and records them, thus creating an audit trail. Periodically, an administrator can produce reports to scrutinize the data.

Two valuable packages — LN Auditor from G2 Technology, tel (02) 955 9682, and LANtrail from Com Tech, tel (02) 317 3088 — address auditing issues effectively. LN Auditor has the best protection against filling the file server disk with audit data: it will automatically stop collecting data if there is less than 1M left on the disk. The product has the most detailed audit trail of all packages and uses user-defined filters that deter-

mine the type of activity to be audited. A filter can designate which of eight files and subdirectory operations to monitor and which are to be monitored. Installation is straightforward, but some customisation for your network is required. The documentation is clear and concise.

LANtrail provides detailed audit trails and a very large selection of well-designed reports. LANtrail is a value-added process (VAP)-based product, but can be used with NetWare 3.11 via an external bridge.

There are three levels of security in NetWare 3.11: initial security (login/password); directory level (trustee assignments and directory rights); and file level (file attributes).

The access-control system should identify users as authentic on the network, confirm they are authorised for the specific type of access requested, and then verify that the users are who they claim to be.

Access-control software enhances network security. It is particularly effective in keeping inexperienced users out of trouble. Access-control software typically restricts users to particular applications or directories and usually includes a menuing system and passwords. For example, the administrator may want to keep specific users out of DOS, thus significantly diminishing the likelihood of security violations.

Access control is a weakness in NetWare 3.11, specifically at the workstation level. User authentication products can enhance workstation-level security.

You can secure workstations with an additional level of password control or the addition of a 'token' or key. A token is a device, such as a 'smartcard', that the user possesses. Combined with a personal identification number (PIN) or a password, the token authenticates that the user is who he or she claims to be. For additional security, the user could be limited to accessing the system from his or her own workstation only.

If management does not have implicit trust in its employees, hardware security measures are always an option. These may take the form of electrical or mechanical locks on mice, keyboards, floppy drives and system units. PC Guardian has an extensive suite of devices for physical security.

Virus scanners are a prevalent way to protect against infection. But a virus scanner only reports that it has not spotted a virus. It can't tell you with certainty that your computer doesn't have one. Scanners work by identifying the signatures of known viruses. If the virus signature has been changed, which is a customary and simple practice, or the file containing the virus is compressed, a scanner typically misses it.

Scanners are a useful first line of defence against viruses, but don't rely on them en-

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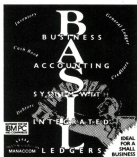
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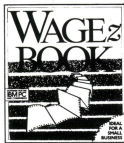
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tirely. The finest protection, short of avoiding practices that put you at risk for infection (such as swapping files and programs or downloading from bulletin boards), is to employ protection that guards against the problems viruses cause, primarily self-replication. That means investing in a virus checker.

A virus checker is always a good buy. Your selection criteria should include performance, quality, versatility, usability, memory requirements, price and volume-purchase agreements. Certus International's NOVI 1.0 has been effective in identifying and eliminating previously unknown viruses.

The first level of access control at the workstation is the network password scheme. One of the most common ways to penetrate a system's security is to guess a user's password. This works when users pick easy-to-guess passwords.

Establish security policies that all employees clearly understand. These policies at a minimum should contain sections about logical security, managerial security and physical security.

The logical section should discuss software security, change control, data security and communications security. The managerial section should address ad-

ministrative security, personnel security and organisational structure. Finally, the physical section should cover physical-access security extensively.

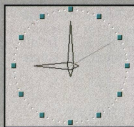
There is a fine line between too much and too little security. Too little protection leaves your company vulnerable to in-

trusion. Too much security is intrusive and it only encourages users to bypass the security procedures.

Security is a complex and never-ending business. These guidelines are far from complete, but they should help you start tightening the security belt — Alan Frank.

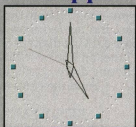


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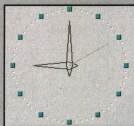
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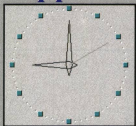
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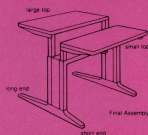
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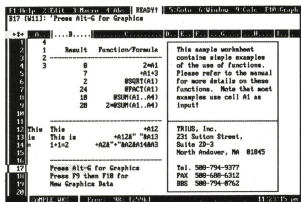
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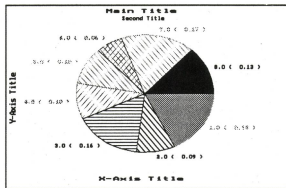
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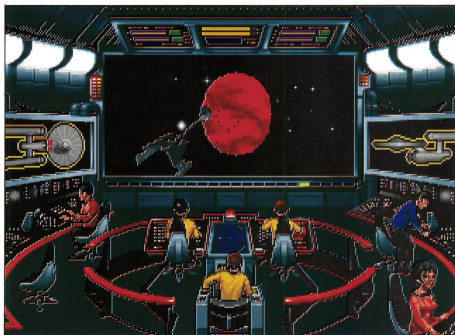
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Take on an entire fleet of Klingons in Star Trek's 25th Anniversary game, or for a real fight, place yourself in Boris Becker's shoes in Loricel's Tennis Cup 2.



Star Trek: 25th Anniversary

Computers: IBM PCs, Tandy and compatibles
Distributor: Electronic Arts
Telephone: (075) 911 388
Price: \$79.95

Adventure gaming on the whole tends to leave me a little cold. When I encounter a problem, I don't want to agonise over it for hours. I prefer to destroy it instantly. Nothing annoys me more than typing 'Give mongoose to hobgoblin' only to read, for the umpteenth time, 'Oh no, brave Sir Knight! To enter the cave you must first give me the sacred underpants of Silnamius!'. I'd rather strangle the hobgoblin with the mongoose and head straight through to the cave of Vestal Virgins and beyond.

But Star Trek, released by Interplay to coincide with the 25th Anniversary of the television series, provides something rather different. Part adventure, part simulator, part interactive movie, the concept can appear confusing, but in reality, this game is as funny and fantastic as the series on which it is based.

The game system is split into two sections: one for when you're on the bridge of the Enterprise; the other for when you're on a planet or another starship. The bridge scene features your crew equipped with weapons, damage and speed monitors, and a navigation display for combat situations.

Learning how to use these monitors is important, since the game begins with a simulated engagement between you and another Federation vessel, the USS

Republic. (This is actually a chance for the game to show off its graphics displays early on because your view of the opponent is quite stunning onscreen.)

After this friendly little ruckus, you receive a message from the Starfleet Admiral, ordering you to investigate some supernatural sightings on the planet Pollux 5. Sitting in the command seat of the Enterprise, I pondered two things: how was I going to get there and, more importantly, with a name like Pollux 5, did I *want* to get there? Luckily, navigating around the universe is simple: just locate the desired planet on your star-chart, and engines away! Once you arrive at the planet, you put the Enterprise into orbit and head for the transporter room with Spock, Bones and a security officer, leaving your beloved craft in the hands of that whiskey-soaked Scottish lunatic, Scotty.

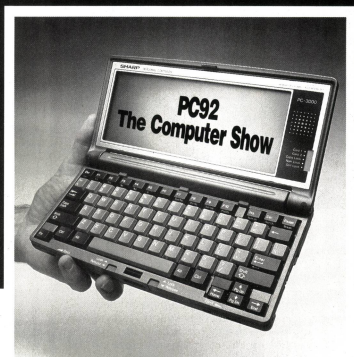
At this point, the game system changes to its second section. When in 'landing party' mode, you are presented with a series of beautifully drawn scenes, each containing your four explorers. You control Kirk. If you want him to move, just point the cursor and click. To interact with the environment, you have a number of actions you can perform: Talk, Look, Get and Use. These can be accessed either with the keyboard, or by clicking on various points of



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an ingenious little command icon, which takes the shape of a waist-to-head graphic of a human. Clicking on the hands, eyes and mouth will initiate the various actions. Hitting the Use icon also allows you to review the current objects in your possession.

So, if you want Spock to use the Tricorder on the Alien Device, click on Use, then nominate Spock, choose the Tricorder icon from your belongings and click on the Alien Device. Bingo! A box appears saying: "Nothing happens."

Great! Try again Jim.

This first mission wasn't too tough, although one particularly uncommunicative priest had me reaching for my phaser rather than my Pollux/Human dictionary. "Learn to relax, Jim," Bones advised.

The interplay between Spock and McCoy is one of the most consistently entertaining parts of the game. Their comments are so true to the series, you can almost hear Leonard Nimoy's sonorous tones and DeForest Kelley's hyperactive yelp in your head. Allowances have been made for every type of control interface

(joystick, mouse, etc) except Vulcan mind-probe.

After working on the first mission for a few hours, I freed the ancient Nauian in the cave and completed the first mission with an 88 per cent success rating. During gameplay, I found that if I was frustrated with the adventure side of things, I could save where I was up to, restart the game, and instead of navigating to Pollux 5, I could head off into the wild black yonder.

As soon as you enter an uncharted sector, you are contacted by its current occupants, either Klingons, Romulans or Elasi space pirates. The captain of the respective race appears onscreen and informs you with varying degrees of politeness that you are about to die.

Your style in ship-to-ship combat will change depending on whom your opponent is, but there are two tips that will help you, regardless of who you are up against: when engaged in space combat, hit the Damage key every 10 seconds or so and repair your shields. Further, constantly change your speed and direction. This

makes you a lot harder to hit. Using these two methods, I successfully overcame four Romulan Warbirds! The Warbirds are probably the least dangerous of your enemies, despite a powerful, single photon torpedo and an infamous cloaking device (which is easily detectable on full View mode). Elasi space pirates aren't too powerful on their own, but move very fast. While you're chasing one, another will line up behind you, so once again, keep moving. The Klingons are the toughest ships you will meet, and if you meet more than two, propose quickly to Lt. Uhura, because you're doomed anyway.

If I have any quibble with this game, it's in the documentation. The manual is far too skimpy for such a complex game, but overall, Star Trek is really something special. The multimedia approach is successfully executed, the graphics and sound are excellent, and the loyalty to Gene Roddenberry's original idea is splendid.

"Not to buy this game would be illogical."

"Thank you Spock. Kirk out."

Nathaniel Tunbridge



If you've ever dreamed of playing Boris Becker in the final at Wimbledon, you may just achieve it with Tennis Cup 2, the second in the Tennis Cup simulation series from French firm Loricel.

Good-quality graphics and attention to detail have produced an atmosphere that makes your adrenalin run and induces a determination to beat that opponent on the other side of the net.

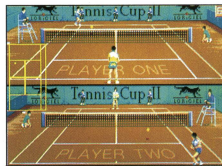
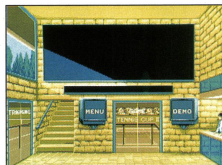
The main menu appears in the form of a clubhouse, with you (the player) and six options displayed: training, stairs, menu, game, demo and bar.

When the player is placed opposite an option, by means of a joystick or left and right arrow keys, that option either flickers (menu and demo) or the doors automatically open (training and game). Hitting Return validates your choice. The stairs option will cause the player to walk up the stairs and change into sports gear, or you can direct him to the bar where an ever-attendant barman will serve you a drink.

It's probably worthwhile having a quick look at the demo option first, where a demonstration game will give you an idea of what a match play looks like, and then

Tennis Cup 2

Computers: IBM PCs and compatibles
Distributor: Mindscape
Telephone: (02) 899 2277
Price: \$79.95



take yourself to a training session to get a feel for the shots. If you try to enter the training area (or game area) without changing out of your jeans, the player will automatically walk upstairs first and then come down in shorts. (Occasionally, he'll be drinking at the bar in a pair of jeans and then quickly change into shorts, without bothering with the dressing room!)

Two play options are offered: practice and training. Practice puts you up against a single ball-throwing machine where you can practice all your shots, staying at the baseline or moving the player to the net to focus on smash and volley shots.

Training presents you with three ball-throwing machines, so balls can come from any direction (but don't fear, a trainer in the top right-hand corner of the screen demonstrates the shot first). Training also enables you to improve your performance rating, which is displayed under the Menu option, and shot execution statistics ('statistiques', actually — the translators must have overlooked that bit) are given on completion of training.

When you feel ready, you can move on to the Menu option to prepare yourself for a game. Under Menu, there are several game parameters that you can select, depending on how you wish to play, including number of sets, game speed, game mode (exhibition or tournament), playing mode (singles or doubles) and number of players. Other options include a split screen, where you can view both players from the same angle; a choice of whether or not to display judges, bearing in mind that having them displayed slows down the

game somewhat; a secondary bird's-eye or side-on view of players' court positions; and a court-type option — clay, quick, hard or grass (irrelevant for tournament mode).

Exhibition matches are probably the best to start off with, until you get a feel for the game and are ready to proceed to tournament play, where you select which tournaments you wish to play during a season. Highlighting a tournament and hitting the space bar presents a table of prize money and ATP ranking points that can be earned at each stage, from the last 16 through to the final. The Masters can only be entered once you've made it to the top eight players in the ATP world classification. This may take some time, however — I even had trouble winning a set at medium speed!

You can choose your name from a list that includes Björn, Boris, Jimmy, Yannick, Goran, André and Pete, as well as the country you wish to represent. I chose to play Boris as an Australian — a clear case of wishful thinking.

The game can be played in two modes: arcade mode, where if you strike the ball, it will land in the corresponding corner of your opponent's half; and simulation mode, which allows you to determine the angle at which the ball is returned.

You can also select to play with assisted displacement: the computer moves the player for you, and your only task is to hit the ball. But this isn't really challenging, so you'd probably opt for manual displacement, which allows you to direct the player using the arrow keys and set up the player. Keeping your finger on the enter key takes the racket back, ready to make the shot,

which is executed when the finger is released.

Game play is fairly realistic, with a short time between shots and the receiving player 'wiggling' in anticipation. Occasionally, your player runs off the court (and subsequently off the screen) to receive a shot, which is understandably a little hard to control! But you can retaliate by performing amazing vintage Connors-type dives in order to execute some unbelievable returns.

After a shot has been won, the crowd applauds, silently. The only sounds you actually hear with the sound option on are a ball bouncing before hitting a shot, the shots themselves and a beep if the ball is out.

The score is displayed towards the bottom of the screen after each point, and a game and set score appears after each game. At the end of the match, the players are shown their score, whereby the winner raises his arms and the loser drops his racket and shakes his head!

All in all, quite a realistic game that will have you determined to improve your ATP ranking and go for the lucrative Masters.

The manual only provides basic information, most of which is evident from the screen. If you have a problem (I still haven't worked out how to get into a doubles game), there isn't much to help you out of it.

One other point: I'm convinced the audience came expecting a Davis Cup match between France and the US — I could swear I spotted Napoleon and Lincoln cheering in the crowd...

Lindsay Hayman

APC reviews the latest offerings to hit the games market.



FernGully: The Last Rainforest

Distributor: Electronic Arts,
(075) 911 388
Price: \$39.95
Computers: IBM PCs and
compatibles

Based on an animated movie and designed for children aged three and older, this game is a computerised colouring book. It claims to help develop a child's computer skills, encourage creativity and concern for the environment. If you are concerned with your children's development, go buy them some colouring pencils and a slab of butcher's paper, take them bushwalking, and show them how to switch the computer off.

Fireteam 2200

Distributor: Directsoft, (02) 489 7853
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Ratings

	Graphics	Sound	Concept	Value for money	Documentation	Level of difficulty
Fort Apache	4	2	3	3	4	4
World Atlas Windows	3	0	3	3	4	3
The Bards Tale Trilogy	3	2	3	3	4	5
FernGully: The Last Rainforest	2	0	2	1	3	2
Fireteam 2200	3	2	3	2	3	3
Hero Quest	4	3	4	4	4	4
Hoyle Book of Games — Volume 3	5	4	3	5	4	4
Samurai: The Way of the Warrior	3	1	2	2	5	2
Storm Master	4	3	4	3	2	5
Ultima: IV V & VI	4	3	4	5	5	5

1: Poor 2: Bad 3: Average 4: Good 5: Excellent

by small graphic images. By using your keyboard, you can order your team to move or adopt an attack strategy, such as strafe, cover and retreat. There are also many scenarios — the early ones are very simple and require little of you other than to control your command vehicle.

The game is not fantastic, but if war strategy games are what you like, it's not bad.

Fort Apache

Distributor: Directsoft (02) 489 7853
Price: \$79.95
Computers: IBM PCs and compatibles

As the newly appointed captain of J troop, you only have one year left to be promoted to Major and leave behind the small-time problems of Devilbush Hill. To gain this promotion, you must provide Fort Dix with as many hardened troopers as you can. To gain experience, you must command your troops in various battles with Indians, bandits and outlaws, and keep the peace as well.

The game's interface is icon driven and works well once you figure out what each icon represents. The battles are boring to look at, but it's the overall picture that you really have to worry about. I found Fort Apache easier to play than other Impressions simulations. Like most historical war simulations, it helps to have an interest in the period being portrayed; since I'm interested in the Wild West, I liked this game.

Hero Quest

Distributor: Mindscape, (02) 899 2277
Price: \$89.95
Computers: IBM PCs and compatibles

Morcar, Lord of Chaos, returns from exile and threatens to disrupt the peace and serenity of the Empire. Mentor, once Morcar's master, has chosen four warriors to find and destroy Morcar before his evil plan unfolds. As either a barbarian, an elf, a dwarf or a wizard (or all four), you must complete a series of quests, each time gaining more experience, and seizing gold to buy stronger weapons and powerful spells. The final quest brings you to a confrontation with Morcar himself.

Along the way, you'll encounter orcs and trolls, zombies and skeletons who must be defeated in battle or avoided. The interface works best with a mouse (keyboard and joystick supported), the graphics are excellent, and the sound is good once you have turned off the annoying background music.

One of the few multi-player games that can actually be played comfortably by four people.

Hoyle Book of Games — Volume 3

Distributor: Ozisoft, (02) 313 6444
Price: \$79.95
Computers: IBM PCs and compatibles, Atari ST, Amiga, Macintosh

Sierra has released yet another volume of popular games. Volumes 1 and 2 were card games. This time it's our favourite board games: Checkers (Draughts), Dominoes, Snakes & Ladders, Backgammon, Yacht (Yahtzee, as we know it) and Pachisi (similar to Ludo). Like all Sierra products, it's outstanding. Choose human or com-

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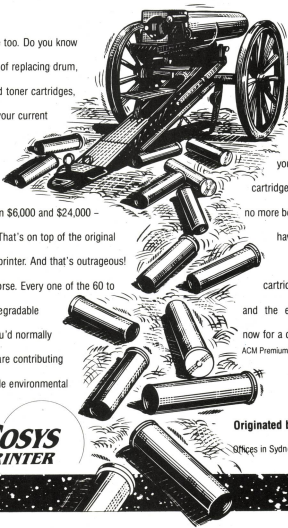
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puter opponents. If you challenge the computer, select your rivals from 18 Sierra superstars, including Larry Laffer and Sonny Bonds. The roll of the die sounds realistic, and the graphics and animation are well done. The family will never tire of these classic board games. Gee, I never knew Larry was such a great Backgammon player!

Samurai: The Way of the Warrior

Distributor: Directsoft, (02) 489 7853
Price: \$89.95
Computers: IBM PCs and compatibles

Another historical war simulation from Impressions, the makers of Cohort and Fort Apache. This one is based on 16th century Japan, a period of civil war where power rested with local lords who dominated small states with their Samurai. Your role is to play one of these lords on the Island of Honshu, and it is your desire to expand.

You rule several towns which generate the income used for purchasing armies, Samurais, riders, archers and spears. Opposing you is another lord with nearly identical resources. The name of the game is expand to win; it's you or him, in a battle to the death. The interface of Samurai is a variation of Impressions' other games: full icon control of your forces. The graphics are impressive, but ruined in the battle scenes by the battle itself: the two opposing armies take at least five minutes to travel from one end of the field into the battle, which then takes more time to resolve. Unless you have a serious interest in 16th century Japanese Samurai, I wouldn't recommend this simulation.

Storm Master

Distributor: Mindscape, (02) 899 2277
Price: \$79.95
Computers: IBM PCs and compatibles

You have just been appointed Grand Master of Eolia, an island on the planet of Urgan. Your mission — loot and destroy the

seven enemy cities before they destroy you. This game claims to combine war, politics, economics, power-braking and arcade-action sequences. To achieve your goal, you have to keep your people well fed and entertained, spy on the enemy, and even design, equip and test flying ships.

The graphics are well done, however the sound effects are barely adequate. The game features an icon-based point-and-shoot interface. The only problem is that it tries to pack too many different elements into the one game. The documentation is not comprehensive enough for such an elaborate game, so if the enemy destroys

you first, it's impossible to know where you went wrong. Hours of trial-and-error playing need to be devoted to this game if you're going to fulfill your mission.

The Bards Tale Trilogy

Distributor: Electronic Arts,
 (075) 911 388
Price: \$69.95
Computers: IBM PCs and compatibles

Another package that offers great value to the Fantasy Role Playing (FRP) fraternity is



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The Bards Tale Trilogy. In volume one, The Bards Tale, the city of Skara Brae is threatened by the evil mage Mangor. Your task is to find Mangor and 'persuade' him to release the city from his evil grip. In the second volume, The Destiny Knights, the Destiny Wand has been broken into seven pieces and placed in a Snare of Death. Your quest is to gather all the pieces before the nasty Lagoth can use it for evil. The final volume, Thief of Fate, involves searching through seven dimensions for the destroyed Skae Brae and gaining the power to defeat the Mad God Trojan along the way. If you succeed, Skae Brae will be restored.

The beauty of this trilogy is that the games meld into each other seamlessly. The interfaces are practically identical and characters from one game, with their acquired skill and knowledge, can be used in the next.

The graphics are all EGA, and there is little interaction except at the keyboard/mouse level. For example, in a battle, you choose a strategy and then the game informs you of your victory or defeat. However, all three games are involving, extensive and challenging. Perfect for the prospective FRP.

Ultima: IV, V & VI

Distributor: Mindscape, (02) 899 2277
Price: \$109.95
Computers: IBM PCs and compatibles

Origin and Lord British have released a trio of games for loyal fans of Fantasy Role Playing. Entitled Avatar, Trilogy of Virtue, this package contains the second trilogy of the long-running Ultima series.

In Ultima IV, your personal ethics are tested in your quest to achieve the eight virtues of Avatarhood. In Ultima V, your strength and skills are tested by a tyrannical leader with a twisted and evil morality. Finally, Ultima VI involves resolving a conflict between two warring races and endeavouring to restore peace and harmony to Britannia.

The progression of graphic style and interface from Ultima IV to VI is amazing. Although primitive by the standards set in Ultima VI, the first two episodes stand on their own with an effective interface, and good story lines and character interaction. So, if you wish to get involved in the genre, this package represents excellent value.

World Atlas Windows

Distributor: Mindscape, (02) 899 2277
Price: \$149.95
Computers: IBM PCs and compatibles

Designed to work with Windows 3.0, World Atlas is part of the new wave of resource software that's finding its way into the market place. With an extensive statistical database that can be updated by the user, the ability to output this information in map and graph forms via a printer, Windows clipboard or .BMP file offers a high degree of flexibility and information.

However, this program suffers from some shortcomings. The most noticeable problem is the poor visual presentation of the maps, especially the opening map of the world, which has all the appearances of a slapdash, last minute effort. Add to this the fact that one can't resize World Atlas' window and that the maps only cater for 16-colour VGA (making the topography maps almost impossible to read), this program starts looking like a polyester suit at a black-tie dinner. Although it does have its uses, unless you have a CD-ROM drive, I would be hard pushed to justify the 6M of disk space it occupies.



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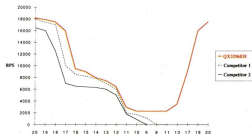
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ISBN: 1-56276-001-7
Price: \$80

This is one of the best introductory guides to networking I have read. If you want to start learning about LANs, then this is definitely the book with which to start.

Frank Derfler writes well, his material is well organised, and he covers the widest possible field in around 400 pages.

Introductory books such as this are often either too much like a university text (admittedly, this is what many end up being) or too much like a manual. Neither is very readable, and for the user who is neither a systems programmer nor an academic, the subject matter is also at times unsatisfactory: the content consists of too much theory and too little practical material or vice versa.

The reader who is interested in using the technology rather than creating or studying



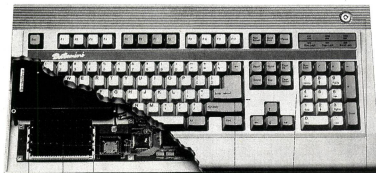
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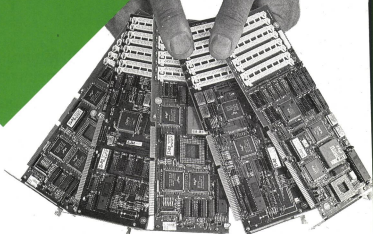
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it needs a balance between the two. And this is just what is provided by Derfler.

In fact, this is about the only book I have read that gives the beginner a clear path through the mine field of 'standards' in the networking world. I particularly liked Derfler's explanation of the OSI model, and after reading it, I found that for the first time, I felt I understood the model.

PC Magazine: Guide to Connectivity shows the reader how products fit into this model. It's this practical information that the user needs.

Derfler is neither an academic nor a programmer. For several years, he headed the LAN side of *PC Magazine* Testing Labs in the US. He has had plenty of practical experience with LANs, and also understands the theory behind them. As Jim Seymour wrote in his introduction: 'Frank Derfler stands out like a light atop a rocky headland, shining clearly through the fog on a treacherous sea'.

While the book covers advanced topics such as X.25, ISDN and network management, it starts with the simplest solutions for connecting printers. It deals with cheap solutions for sharing resources, such as printer buffers and data switches, and looks at the simplest LANs and multiuser DOS systems.

From there, Derfler discusses more complex LANs. He also devotes a chapter to cables and adaptors, where he takes into consideration the various topologies or ways in which the actual physical connections between computers can be organised.

A chapter devoted to Ethernet, Token Ring and ARCnet examines the advantages and disadvantages of the various types of these three LAN cabling systems. Derfler

then goes into some detail on the way network operating systems tie LANs together. Again, he relates this discussion to actual products.

Finally, Derfler looks at important but slightly more peripheral topics, such as network management, workgroup products, connecting LANs to mainframes and the mechanics of linking LANs together.

The book comes with two disks that contain a fully functional but limited E-mail system and a sample workgroup product. Both are intended to give the new LAN user an idea of how these sorts of products can be useful.

PC Magazine: Guide to Linking LANs

Author: Frank Derfler
Publisher: Ziff-Davis Press
 (Distributed by
 Woodslane)
ISBN: 1-56276-031-9
Price: \$80

As companies begin to appreciate the strategic advantages in integrating information systems between different departments as well as across company boundaries, it is becoming more important to be able to link LANs. If LAN technology is still something of an arcane science, then linking LANs together is even more remote from most people's experience.

In *PC Magazine: Guide to Linking LANs*, Frank Derfler makes this topic accessible to experienced computer users. As there is little introductory material, readers new to LANs would be well advised to read *PC Magazine: Guide to Connectivity*

(reviewed previously) before tackling this book.

After an overview of LAN technology, Derfler looks briefly into the various ways you can connect LANs. The next 10 chapters go into greater detail.

The book deals with how to connect LANs located in the same building or in a complex of buildings, as well as networks that are spread around the globe.

For LANs located close to each other, and for permanent links in WANs, Derfler discusses repeaters, bridges and routers. He covers in some detail the various protocol considerations and, in particular, routing under NetWare. He not only looks at the physical links, but also at how they affect important LAN functions. A whole chapter is devoted to creating E-mail links so that messages can flow freely between users on separate LANs.

If there is anything to criticise in the book, it's that Derfler mentions very little of the difficulties of connecting different E-mail packages. While you should be able to link any MHS-compatible packages, it is a very difficult exercise.

For remote access, Derfler considers the various options, bulletin boards, WAITS and access servers. This is backed up with a discussion on modems and also a look at how you can create permanent links using leased lines and multiplexers. While probably less relevant here than in the US, Derfler looks at ways in which you can bypass Telecom to create remote links.

There is an important section on X.25 and frame relay connections. Derfler also considers the complex issue of managing interconnected LANs and devotes some time to interoperability.

Other titles available on connectivity

Title	Author	Publisher	Distributor	ISBN	Price
Enterprise Series: Connectivity	New Riders Publishing	New Riders Publishing	Prentice Hall	1-56205-048-6	\$99.00
Inside LAN Manager	Greg Denenfeld	New Riders Publishing	Prentice Hall	1-56205-023-0	\$61.95
Inside Novell NetWare	Debra Niedermiller	New Riders Publishing	Prentice Hall	1-56205-022-2	\$61.95
Managing Novell NetWare	New Riders Publishing	New Riders Publishing	Prentice Hall	1-56205-041-9	\$81.95
Mastering Novell NetWare	Cheryl Currid & Craig Gillet	Sybox	The Law Book Co	0-89588-630-8	\$59.95
Networking Personal Computers	Michael Durr & Mark Gibbs	Que	Prentice Hall	88022-417-7	\$51.00
Networking with 1-2-3	Carolyn Jorgensen & Bill Lawrence	Prentice Hall Publishing	Prentice Hall	013-612136-5	\$49.95
Novell NetWare on Command	New Riders Publishing	New Riders Publishing	Prentice Hall	1-56205-011-7	\$41.00
Using Novell NetWare (Second Edition)	Bill Lawrence	Que	Prentice Hall	88022-756-7	\$61.95

PC Magazine: Guide to Using NetWare

Author: Les Freed and Frank Derfler
Publisher: Ziff-Davis Press (Distributed by Woodslane)
ISBN: 1-56276-022-X
Price: \$85

This is another in the *PC Magazine* series of books on networking. Although not as comprehensive as the other two, it is still useful, and will find a ready market. The book is aimed at Novell network users, rather than system administrators or LAN managers.

While important aspects of NetWare are covered, there is also material of questionable value. For example, the book examines NetWare menus. These can be useful for novices, but I suspect that any user who has reached the stage of using the more complex commands covered in the book will not have many uses for the NetWare menus.

While this book is aimed at novice NetWare users, it's not for those who are new to computing. To get the most out of this book, the reader will need to have a substantial understanding of DOS. And I would certainly recommend this book to those installing a NetWare LAN for the first time or new users who need to learn the mysteries of the network operating system.

I have never found manuals particularly easy to read, and the NetWare manuals are no exception. In contrast, *PC Magazine: Guide to Using NetWare* is readable, well laid out and also useful as a reference book to turn to on those rare occasions when you may need to utilise some of the intricacies of the CAPTURE command. However, I believe that this book will spend most of its time on the shelf. Once you have set up your NetWare environment and created a few batch files to handle printer changes, you'll probably have little need to refer to the book unless your LAN is radically reordered.

PC Magazine: Guide to Using NetWare begins with an overview of the various versions of Netware, up to and including Version 3.11, which is particularly useful in understanding the limitations of earlier versions of the system.

Other useful material includes how to make the connection to a Novell network, the differences between local and network drives, MAP and CAPTURE commands in detail, network printing in general, and PCONSOLE. From there, you can delve into whatever interests you, including memory management for users wanting to run large applications, NetWare and Windows, NetWare and the Macintosh, NetWare and OS/2, and third-party products for Novell.

Managing Information Networks for Competitive Advantage

Author: Stephen Ives
Publisher: Computer Weekly Publications (Distributed by Butterworth)
ISBN: 1-85384-023-8
Price: \$68

Managing Information Networks for Competitive Advantage is aimed at managers who do not have much experience with networking computers.

Steven Ives, the author, explains that information networks can provide an important business advantage. Of course, he goes further by explaining to his readers that good information networks are now a vital part of any business. 'If you wish to remain competitive in the '90s and beyond, you will have no option but to employ the services of computing and communications technologies.'

To support this argument, Ives uses many examples. While this anecdotal evidence can inspire, many of the examples are now outdated. This is not to say that I disagree with Ives' central thesis; rather I would suggest a more measured approach. Information systems are important tools,

but they are not an end in themselves, and it's too easy for some people's enthusiasm for new technology to obscure this fact.

Still, if you want a good explanation of information technology, then this book is ideal. It delves into the importance of standards, the history on information systems, how to integrate information systems, and one chapter is devoted to case studies and an appendix entitled 'Ten golden rules for successful information networking'.

Microsoft LAN Manager: A Programmer's Guide Version 2

Author: Ralph Ryan
Publisher: Microsoft Press (Distributed by Penguin Books Australia)
ISBN: 1-55615-166-7
Price: \$50

Only readers with a good understanding of LAN Manager or who have written applications for other network operating systems will benefit from this book. The author, Ralph Ryan, was the project manager for the group that developed LAN Manager.

Microsoft LAN Manager: A Programmer's Guide Version 2 strongly resembles a manual in that much of its content is devoted to detailed descriptions of various LAN Manager application programming interfaces (API).

Ryan recommends that readers also obtain a copy of the Microsoft LAN Manager Programmer's Toolkit, and while I haven't seen these manuals, I'd take a close look at them before purchasing this book.

Ryan also chooses to ignore other network operating systems; he makes no attempt to help readers familiar with other operating systems to compare the similarities or differences with LAN Manager.

If you have the necessary experience to use this book, then you may want to order the companion disk, which contains all the source code from the listed examples.

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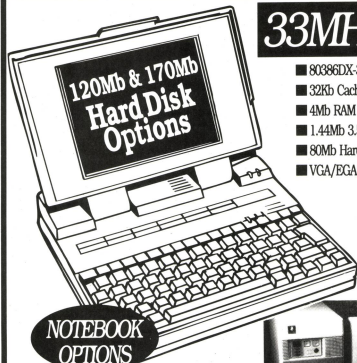
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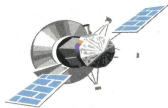
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Person to Contact: Position in Company:

Address:

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BBS: pulsating with information

When bulletin boards first appeared, most users of a particular board knew each other as people, not just as names on a BBS. Consequently, discussions were a pretty mixed bag. The volume of messages was relatively low, so people's favourite recipes appeared alongside detailed technical debates about the merits of particular chips. By the mid-to-late '80s, computer (and more importantly, modem) ownership had mushroomed, and in some people's eyes, the level of debate had fallen to 'my computer is better than yours', mainly due to the influx of users of tender years.

The number of messages steadily grew and exploded with the arrival of FidoNet and similar networks. By this time, messages were divided into separate areas for different topics. Another approach to the problem of message overload was the creation of special-interest boards. While the majority took a broad-brush approach, these boards concentrated on specific topics such as science fiction, amateur radio, gaming, music or software development.

But do you realise just how wide-ranging discussions are on today's BBSs? Melbourne's AUSOM BBS lists around 1300 newsgroups. Topics include astrology, censorship, education, fishing, food, games, humour, music, religion, sexuality, sociology, sport, and just about any computing speciality you can imagine. Since this board is connected to an international network linking mainly mid-range and mainframe systems, the list is admittedly longer than you would find on a typical BBS. However, it does show what's available.

HST Modems

There has been quite a fuss in the past few months over the use of unapproved HST modems. These high-speed modems are popular in some circles, due to their performance over international circuits. Austel has naturally been rapping knuckles over their use, just as it has with other unapproved equipment.

The good news for HST lovers is that

three external modems from the US Robotics Courier range have received Austel approval. A production run of the Australian version is underway. Prices hadn't been set at the time of writing, but the importer (Laserbaud, tel (03) 853 9780) will be offering special prices for sysops and an 'amnesty trade-in' for owners of unapproved Couriers.

Fax modem

Looking for an inexpensive Australian fax modem? Avtek's \$299 PC MegaData Fax-Modem supports Group III fax at up to 9600bps, and data at 1200 and 2400bps. AutoSoft communications software and the PC Fax System are included. For more information, call 008 027 973.

Approval

Readers may recall that in March last year, I suggested that vendors of unapproved modems should be required to warn buyers of the possible consequences of connecting such a device to the telephone system.

It seems Austel has come to the same conclusion. It now specifies that the following statement must be made in writing to purchasers of devices without an Austel permit: 'This customer equipment has no Austel permit and may be dangerous or damage a telecommunications network. Connection to a telecommunications network is an offence under section 253 of the Telecommunications Act 1991 and may attract a maximum fine'.

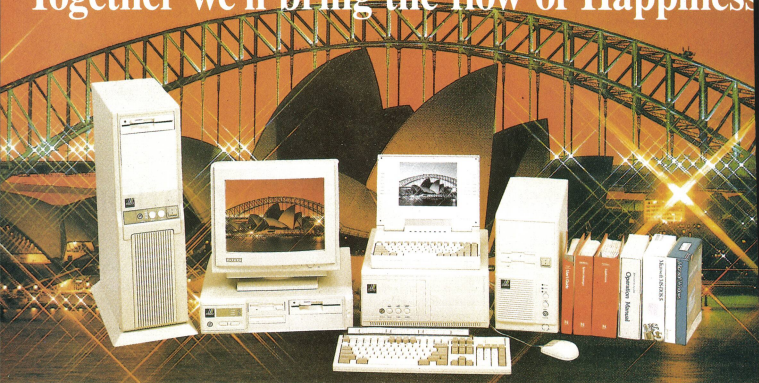
The telecommunications regulator has made it clear that it is prepared to prosecute traders who do not comply.

More modem programs

HS/Link (Communications, APC March 1992) isn't the only bidirectional file transfer protocol. According to Barcastle Enterprises officials, BiModem has a number of advantages including the ability to 'chat' and add further files to the list during the transfer process; passwords on files and directories; multiple directory search for

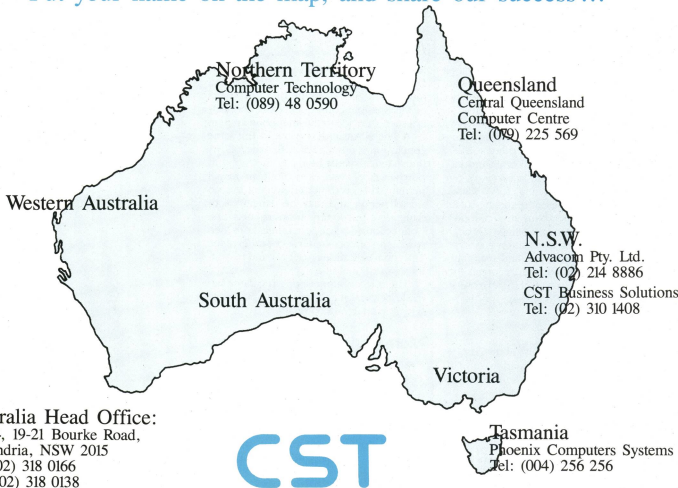
Stephen Withers takes a look at the expansive range of topics covered on bulletin board systems, Austel approval, and a variety of modems and programs.

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files; and the ability to tag files from local disks, a list of files on a BBS, or from information displayed onscreen.

Barcastle also distributes Qmodem, which is now up to Version 5.01. One of the major changes to this release is the inclusion of Off-Line Xpress, a QWK-compatible offline mail reader that can be used with a variety of mail systems. Mail readers such as this are very useful for minimising your connect time, which benefits your fellow users and can reduce your phone bill.

Another convenient feature is that the text editor has now been separated from the rest of the code, allowing its replacement by your favourite editor. QMEDIT's compatibility with WordStar commands might be an advantage for some users, but those who have cut their teeth on a more modern program will welcome the change.

Qmodem's dialling directory has been enhanced with three new fields, which allow the specification of the keyboard definition, emulation mode and serial port to be used when calling that service. In addition, the program has an extended list of keyboard macros and now fully supports ANSI music.

Contact Barcastle on tel (03) 720 1975.

New systems

NSW

Club Mac BBS (02) 314 1322 Multi-Line. MV. John Agapitos. V.21, V.22, V.22bis, V.32. 24 hours.

Lamplighters BBS (02) 955 1777. P. Mike Kesterton. V.21, V.22, V.22bis, TrailBlazer. FidoNet 3:714/906.1. 24 hours.

MidnightCaller BBS (02) 888 5502. P. Midnight. V.21, V.22, V.22bis, V.23, V.32. 24 hours.

Skylark BBS (02) 669 3991. M. Con Douleris. V.21, V.22, V.22bis, V.23. 10pm-7am weekends.

The Rockpool BBS (02) 899 7812. P. Lord Michael. V.21, V.22, V.22bis. 24 hours.

INFOcentre (047) 366263. MV. Scott Golby. V.21, V.22, V.22bis, V.23, V.32. 24 hours.

The Jazz Line (042) 96 9481. P. Anthony Ramien. V.21, V.22, V.22bis, V.23, V.32. GTNet 302/900. 10pm-4.30am daily.

Vic

Class M Binary Systems (03) 360 4397. MV. Allan Michelmore. V.21, V.22, V.22bis, V.23, V.32. 6pm-6am weekdays, 24 hours weekends.

Neighbourhood BBS (03) 434 6348. MV. Laurence Forbes. V.22, V.22bis. FidoNet 3:633/254. 24 hours.

SOLDIER OF FORTUNE bbs (03) 579 0892. MV. John Clark. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:632/327. 24 hours.

The Eastern Online BBS (03) 874 2106. V. Dean and Wayne Galloway. V.22, V.22bis. FidoNet 3:636/208. 24 hours.

ACT

Catnip BBS (06) 292 5682. MV. Tony Holten. V.21, V.22, V.22bis. 24 hours.

Qld

Amiga Resource (07) 265 3369. MV. Brian Jeffery. V.21, V.22, V.22bis. 24 hours.

Little ChinaTown (07) 371 6101. MV. Jason and Marcus Lee. V.21, V.22, V.22bis, V.23, V.32. 24 hours.

The Rabbit's Warren (07) 344 4192. P. Tony Warren. V.21, V.22, V.22bis. 24 hours.

WA

Algorithms Anonymous (090) 93 3145. P. Glenn Crouch. V.22bis. 24 hours.

Coast To Coast BBS (09) 490 1790. MV.

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Geoff Henderson. V.21, V.22, V.22bis. FidoNet 3:690/646. 24 hours.

SKY HOOK BBS (09) 398 5505. P. Stephen Thompson. V.21, V.22, V.22bis. 24 hours.

The Byteline BBS (09) 497 3819. MV. Andrew and Michelle Stephen. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:691/245. 24 hours.

The Electrical Connection BBS (09) 337 7646. MV. Brad Pohl. V.21, V.22, V.22bis, V.23. FidoNet 3:690/722. 24 hours.

White Ghost (09) 448 1177. MV. Eric Heenan. V.21, V.22, V.23. FidoNet 3:690/716. 24 hours.

Updates

NSW

A City of Los Angeles (02) 456 4055 Multi-Line. M. Paul Johns. V.32, TrailBlazer. FidoNet 3:711/457. 24 hours.

Amiga Magic BBS Permanently offline.
Devro's Sausage Bulletin Board System (02) 548 1476. MV. Jerzy Farynski. V.21, V.22, V.22bis, V.23. 24 hours.

Electronic Gazette See Devro's Sausage Bulletin Board System.

Infolink Australia BBS See Ontron Australia BBS.

Lost Hope BBS Permanently offline.

Mad Max BBS Temporarily offline.

Ontron Australia BBS (02) 564 2172. MV. Christian Kraus. V.22, V.22bis, V.32, V.32bis. FidoNet 3:712/607. 24 hours.

PALANTIR BBS — On the Bauder! (02) 975 3355. P. Steve Sharp. V.21, V.22, V.22bis, V.32, V.32bis. FidoNet 3:714/207. 24 hours.

TCS Communications Systems Permanently offline.

The Bad Influence BBS (02) 525 8582.

Format of listings

Entries in our listings contain the following information: system name, telephone number, access, operator's name or alias, supported modem standards, network node number and hours of operation.

The access code may be P (Public), M (Members/registered users only), MV (as M, but with limited Visitor access).

The main modem standards are V21 (300bps), V22 (200bps), V22bis (2400bps), V23 (1200/75bps) and V32 (9600bps). HST and TrailBlazer are de facto high-speed standards, while Bell 103 and 212 are the US standards for 300 and 1200bps operation.

The three main BBS networks in Australia are FidoNet, GNet and SNet.

These networks provide a way of wending messages between boards, whether they are in the same suburb or half a world apart.

Submissions

The information in this column is provided by the Australian BBS Registry. It is presented in good faith but APC cannot take responsibility for its accuracy. New information and updates should be sent to the Registry Co-ordinator in your state.

You can also post BBS List news onto the EchoMail conference, BBS NEWS, which is available nationally as a public area. NetMail general enquiries to Rodney Creer at 3:713/317. Postal registrations or enquiries to PO Box 731, Penrith NSW 2751.

NSW Greg Kuhnert. 2000 and Beyond/AliveBBS, (02) 544 7123, FidoNet 3:712/513.

MV. Sam Wong. V.22, V.22bis. FidoNet 3:712/524. 9pm-8am daily.

The Jolly Joker's Hideout Temporarily offline.

The Moeblis Link (02) 960 3434. M. Simon Bounds. V.21, V.22, V.22bis, V.23, V.32. GTNet 302/022. 24 hours.

The Realms BBS Possibly offline.

YABB Permanently offline.

Zoo Lake Grunters (02) 365 7960. MV. Peter and Mark Laurence. V.21, V.22, V.22bis, V.32. FidoNet 3:714/910. 24 hours.

AXL's (069) 31 4623. MV. Tony Lohrey. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:621/525. 24 hours.

Beauford BBS Permanently offline.

Black Stump BBS Permanently offline.

Lake Macquarie BBS (049) 56 2853. MV. Matthew Taylor. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:622/497. 24 hours.

Landover Amiga BBS (043) 23 6241. P. Lance Lyon. V.21, V.22, V.22bis, V.23. FidoNet 3:711/432. 24 hours.

The Hollow Hills See Landover Amiga BBS.

Vic

Andromeda Connection (03) 689 8005. MV. Michael Sherman. V.21, V.22, V.22bis. FidoNet 3:635/521. 24 hours.

Andy's BBS (03) 357 3414. MV. Andrew Gulovsen. V.21, V.22, V.22bis, V.23, V.32, TrailBlazer. FidoNet 3:635/503. 24 hours.

Delta BBS (03) 568 1112. V. Big Brother. V.21, V.22, V.22bis, V.23. 24 hours.

Direct Access BBS Permanently offline.

Guru Meditation BBS (03) 326 0440 Multi-Line. MV. George Seremetidis/Felicity Jones. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:635/542. 24 hours.

ICe! Box Possibly offline.

Oblivion Plus BBS Permanently offline.

Orion (03) 885 0002. P. Peter Fortey. V.21, V.22, V.22bis, V.32. FidoNet 3:632/338. 24 hours.

Solaria BBS Permanently offline.

Vic Richard Stocks, Offline, (03) 808 4510, FidoNet 3:633/374.

ACT Craig Gibson, Caught in the ACT BBS, (06) 292 8040, FidoNet 3:620/252.

Qld James Collins, The Galaxy GateWay Computer System, (07) 207 8900, FidoNet 3:640/230.

SA/NT Grayham Smith, Oracle PC-Network, (08) 234 0791, FidoNet 3:680/804.

WA Graeme Pitt, 1990 Multiline, (09) 370 3333, FidoNet 3:690/654.

Tas Roy Austen, Tassie DataBank, (003) 44 9762, FidoNet 3:670/301.

National Rodney Creer, Australian BBS Registry, (047) 35 6362, FidoNet 3:713/317, PO Box 731, Penrith NSW 2751.

The Brick Centre (051) 46 0797. V. Elaine Ralph. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:633/151. 24 hours.

The Games Machine Possibly offline.

The Silicon Bit BBS (058) 52 2121. P. Trevor Jennings and David Latter. V.21, V.22, V.22bis, V.23, V.32, V.32bis. FidoNet 3:635/504.2. 24 hours.

Villains BBS Permanently offline.

ACT

Bad Boys Sector (06) 241 4786. MV. Daniel Seger. V.21, V.22, V.22bis. 7pm-8am weekdays, 24 hours weekends.

BBS Mania Permanently offline.

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C&O Systems Permanently offline.

Night Moves BBS (07) 262 2694. P. Danny Carver. V.22, V.22bis. 24 hours.

Psychopolis (07) 284 7796. MV. Robert Gill. V.21, V.22, V.22bis, V.23, V.32. 24 hours.

The Eastern Star (07) 207 9543. P. James Collins. V.22, V.22bis. FidoNet 3:640/230. 24 hours.

The Flying Scotsman Permanently offline.

The Noddy Connection See Psychopolis.

The Rhitz BBS See Night Moves BBS.

SA

Adelaide Central BBS (08) 344 8616. MV. Paul Lawrence. V.21, V.22, V.22bis, V.23. FidoNet 3:681/859. 24 hours.

The Blue Max BBS (08) 374 2702. P. Paul Tenby. V.21, V.22, V.22bis, V.23, V.32. FidoNet 3:680/837. 24 hours.

WA

Gamma Istari BBS Permanently offline.
Jayne (09) 375 2238. P. Dave Nagle. V.21, V.22, V.22bis. FidoNet 3:690/714. 24 hours.

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Conferences/Meetings

June

9 Managing Projects Fred Pryor Seminars offers this one-day seminar in Melbourne to provide attendees with all the essentials for successful project management. *Enquiries, Fred Pryor Seminars, tel: (0014) 800 125 385*

10 Australian LAN Manager Users Group The group meets on the second Wednesday of each month at the Crows Nest Club in Sydney. LAN Manager network administrators and interested users are invited to attend. *Enquiries, Graeme Le Roux, tel: (02) 968 1595*

10-11 Developing the Australian Communications Industry Discover how you can take advantage of growth and development opportunities to build on the local telecommunications industry and assist its integration into world markets. IIR is holding this seminar at the Sydney Marriott Hotel. *Enquiries, IIR, tel: (02) 929 5366*

15-16 Telecommunications — Setting your Strategies MTE presents this seminar to provide you with the very latest policy and technical information on your options in the newly de-regulated Australian market. It will be held in Melbourne and include guest speakers from OPTUS, AOTC and AAP. *Enquiries, Jayne Potts, tel: (03) 629 5811*

15-17 Barcode Techniques Sponsored by Monarch Marketing Systems, a series of one-day seminars on barcoding will aim to cover barcoding basics, use of symbologies and getting started. They will also take a closer look at a wide variety of applications. *Enquiries, Chris Hall, tel: (02) 647 1833*

16 Computer Aids for Quality Management of Projects ACADS-NSW is holding this seminar at the 729 Club in St Leonards, Sydney. *Enquiries, ACADS-NSW, tel: (02) 368 1171*

July

1 Computer Technology for Lawyers The New South Wales Society for Computers and the Law presents this seminar in conjunction with the College of Law at the Masonic Centre in Sydney. It will be held from 2pm to 5pm, and all members of the legal profession are welcome, particularly those who do not have a specialist knowledge of computers, but would like to know more. *Enquiries, Stephen Blanks, tel: (02) 555 8854*

Exhibitions/Meetings

June

16 Project Management Tools: An Update ACADS presents this seminar at the 729 Club, 80 Christie Street, St Leonards, Sydney, on this day at 3pm. It is aimed at design managers, and will take a look at recent developments in project-management procedures as well as the possibilities available when coupled with integrated software packages. *Enquiries, Hazel Baker, tel: (02) 368 1171*

18-20 NOPEX '92 The National Office Products Association is holding this exhibition and seminar of office technology at the World Congress Centre in Melbourne. *Enquiries, Garry Burns, tel: (03) 696 0666*

July

19-20 PICK Exhibition This exhibition, to be held at RMIT in Melbourne, will feature PICK and Open Systems hardware and software products. *Enquiries, Stas Lukaitis, tel: (03) 660 2254*

August

11-14 PC92 Melbourne takes its turn to host Australia's definitive computer exhibition, which will feature the latest innovations in computer technology, data transmission, printers and software. In conjunction with the Australian Computer Society, a one-day seminar, PC92 Burning Issues, will also be staged. *Enquiries, Australian Exhibition Services, tel: (03) 867 4500*

Training

June

9 NetWare 3.11 System Manager This is the first of a six-evening course in NetWare 3.11 System Manager offered by Educom at its training premises in Sydney. *Enquiries, Educom, tel: (02) 957 1633*

10 DrawPerfect 1.1 The first in a two-part course in DrawPerfect presented by M&S Computing of North Sydney. *Enquiries, Vicki Pund, tel: (02) 954 0333*

10-11 Excel for Windows 3.0 DOS — Introduction The ACS aims to provide participants with an introduction to this program. *Enquiries, ACS, tel: (02) 283 5544*

11-12 SCO Unix/Xenix Introduction AMS Brisbane is holding this course for SCO Unix/Xenix users who require an understanding of how to use the systems to their fullest. *Enquiries, Robyn Dunne, tel: (07) 368 2480*

15 Project Management Training: Advanced This course, from Asyst of Adelaide, covers the more sophisticated aspects of TimeLine's features, such as the Work Breakdown Manager, multiple scheduling, macro creating and editing, export and import of data into third-party software, and more. *Enquiries, Alan Wisniewski, tel: (08) 364 1547*

15 Advanced Systems Design BIS presents this completely updated course in advanced systems design, which is aimed at systems analysts, in Canberra. *Enquiries, Judy Hillyard, tel: (02) 922 1899*

15 Applications Programming — Cobol Workshop BIS presents this Cobol workshop for programmers in Melbourne. *Enquiries, Judy Hillyard, tel: (02) 922 1899*

23-24 Advanced Computer User Documentation Sydney is the venue for this course from Communications Publishing which promises attendees intensive training in planning, design, writing and editing, as well as management of effective user documentation. *Enquiries, James Crown, tel: (02) 524 5882*

Diary Data is compiled by Janice Hogg, tel: (02) 288 9130. For inclusion in this section, fax details of your upcoming conference, meeting or exhibition to Janice on (02) 267 4903.

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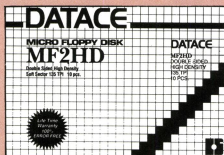
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This month, our ever-resourceful 'snoopers' spy on an array of rumoured tidbits, from TungKiss(ing) Your Money and close encounters in Australia and New Zealand, to companies screaming 'Foul!' and others offering rewards to unseal lips.

If proof were ever needed that Australia had finally arrived as a world force in software, then a Melbourne software company, Dynamo House, may have proved it with the release of two programs that will prove irresistible to PC users looking for the next wave of applications software.

The first is enigmatically called *Initiation*. Here's the blurb. 'Initiation is a totally unique program that brings a multidimensional quality to your PC. Initiation is one of the first of a new breed of interactive software products which combines the digital power of the computer with astonishing graphics and fascinating text'.

The program apparently takes users on a journey through the great occult mysteries of the world, 'enabling you to enjoy and relax with your computer'. The program will 'inspire your imagination and challenge your skill'. Chip Chat can't wait for the review copy!

About 500 business personal computers are sold in Australia each year and Mr McGauran said the massive copying of software was responsible for high software prices.
Mr McGauran said Aus-

Chip Chat knew the computer industry had been hit by the recession, but had no idea PC sales were so low. The Opposition spokesman on science and technology also claimed there were just 700 computer programs on the Australian market. Let's hope his Fightback numbers are more accurate!

But if that's not enough to take your breath away, there's more. Dynamo's second masterpiece is *UFO Research in Australia and New Zealand*. 'The program offers an exhaustive look at UFO activity in our region', reads the cover blurb. Over 90,000 words of text and an illustrated book tell users all about close encounters, very close encounters, abductions, telepathic contact, etc.

Both programs are certainly value for money at \$30 each. With programs like this, Dynamo looks set for a dynamic future. Microsoft, Borland and the rest had better watch out.



Rumour and gossip is part of the normal cut and thrust of the PC business. But, occasionally, it gets out of hand, as Osborne Computers has found to its disadvantage.

In recent months, the company has been so affected by malicious rumours about its financial viability that it took out a quarter-page advertisement on page three of the *Australian*, offering a \$10,000 reward for evidence leading to the successful prosecution of the person or people responsible for the gossip.

The advertisement detailed the scaremongering, what was being said, and what the real situation was. It even went so far as to list major creditors and the cost of goods they supply to Osborne each month.



Dynamo is not the only Aussie company with a few kangaroos loose in the top paddock. Three fluoro pink stickers reading 'TungKiss Your Money' heralded the most asinine product release of recent weeks from a Sydney company called Bloody Good Software. Its puerile press release announced that the company had released a personal finance manager called, for some strange reason, TungKiss Your Money. A director of the company was quoted saying: "Money is a lot like marriage. If you don't maintain an intimate relationship with your spouse, you'll wind up without one. Likewise, if you don't keep intimate control of your money, then you'll end up with none — or worse."

Putting aside this childish rubbish, Chip Chat discovered that the program is not actually that bad. The author is the man behind Magician, a great graphics program, and TungKiss Your Money is a subset of an established accounting package, Hunter Accounting Suite. If Bloody Good Software changed its tone, perhaps some people might look seriously at the product.

Osborne has been frustrated by the unwillingness of customers and journalists who contact the company about the rumours, yet refuse to say who the source was.

Osborne believes competitors for Federal government business, where it has been spectacularly successful, are behind the whisper campaign.

Hooping hard cash will unseal lips, Osborne's reward is \$2000 for a signed and corroborated affidavit recording slanderous comments about Osborne, and \$8000 when the named person is successfully

prosecuted. So, if you are the guilty party, there's a price on your head.



Microsoft's US parent is finding it tough to keep out of Chip Chat, regardless of how well behaved the local operation is. In the battle to knock WordPerfect off the top of the word processor tree, it has been running the results of a user 'survey'.

Billed as the Word Processor Challenge, it pitted Microsoft's Word for Windows

Down the line

Acquisitions and mergers department: Remember the days when computer companies could be counted on the fingers of one hand? And when one out of two data-processing shops only had to deal with one supplier — IBM? If you're under the age of 30, you probably don't. Anyway, those halcyon days may shortly return, at least in the PC software market.

First we saw Borland buy Ashton-Tate for \$520 million. Then Microsoft announced its intention to buy Fox Software for around \$222 million. Now, **seasoned takeover-merchant Computer Associates (CA)** has bought into the dBASE-compatible database market with its proposed acquisition of Nantucket for a rumoured \$107 million. All we need now is Lotus to purchase WordTech Systems — developer of Arago dBase and Arago Quick Silver — for around \$50 million and there'll be none of the original dBASE compiler developers left.

As Borland ironically stated in its press release on the Nantucket takeover: 'Welcome to the dBASE club'. Microsoft would probably have said 'xBASE' club if its communications department had been **thinking as fast on its feet**. Both companies will be looking over their shoulders, however, at CA, which with \$1.7 billion in revenues is second only to Microsoft in size in the software industry. CA, with its huge installed base of **mainframe database software** and aggressive Windows strategy, can be expected to take Nantucket's Clipper compiler and turn it into the core of an up-to-date commercial database application as fast as it possibly can.

CA may find this to be no mean feat, however. This is reflected by the **dirty-cheap** purchase price of the company, compared with Ashton-Tate and Fox. Nantucket insiders say they doubt CA realises the full extent of the differences between Nantucket's offerings and products, such as Fox-Pro and dBase. They say Clipper, which boasts numerous extensions to the dBASE language standard, is aimed more at the developer community, and will require a complete overhaul to win the ears and minds of users.

against WordPerfect for Windows. Users were asked to rate each product on the ease of accomplishing set tasks.

Not unexpectedly, the Microsoft product was rated easier to use by 80 per cent of the subjects — not a bad figure on which to base an advertising campaign.

Unfortunately, WordPerfect refused to take the result at face value. It discovered that only 24 people took part in the survey, and only eight features were tested. These features were picked to highlight areas where WordPerfect for Windows is least impressive.

Foul! cried WordPerfect. Fair cop! replied Microsoft, agreeing to put another 200 people to the test. The results of that have not been publicised. Judge for yourself.



IBM's release of OS/2 2.0 caused a minor stir among the

more patriotic members of the press gallery. In its enthusiasm to extol the virtues of the product, IBM gave some the impression that the product was made in Australia by printing an Australian Made logo on the first OS/2 manuals.

Few press members were fooled into believing that IBM had secretly developed OS/2 right under our noses. However, since OS/2 is exported from Australia, disks are duplicated here, and local firms produce the manuals and packaging. IBM believes it is not totally out of line in its local content claim.

Nevertheless, IBM released a statement clarifying the Australian Made situation. 'We are proud that manufacturing is carried out in Australia. The qualification as Australia Made was spawned in conjunction with the Ready to Run PS/2 package in November 1990. Since it appears that this manufacturing qualification may have caused some miscon-

Software Pricing Surveillance Department: Hardly a day goes past without evidence surfacing that software prices in Australia are really much higher than in the US, despite what the Business Software Association of Australia (BSAA) says. The BSAA can only justify its position because high prices are least evident in the market for popular business applications, such as word processors and spreadsheets — the majority of the software that BSAA member companies, such as Microsoft, Lotus, WordPerfect and Autodesk, sell.

Take a look at the cost of **software development tools**, however, and it's a different story. The latest example is Intersolv's Design Recovery for DOS, a product which retails for \$8666 (at current exchange rates) per user in the US, yet costs \$14,500 per user in Australia (a price differential of 67 per cent). Of course, it's **highly unlikely** that Design Recovery — which captures information about old Cobol-based applications for re-engineering using modern software engineering techniques — is in use in more than half a dozen sites around Australia. Nonetheless, this is exactly the sort of application which is needed to keep Australia at the leading edge of software technology. If a business user is unhappy with the cost of WordPerfect or Lotus 1-2-3, there are plenty of cheap shareware programs out there which are nearly as good. When you're talking about **leading-edge CASE and re-engineering tools**, however, the choice is somewhat more limited.

On the positive side, Autodesk's AutoSketch for Windows and Graphic Impact business-graphics products will sell locally next month at parity with the US list price — \$399 (SUS299) and \$199 (SUS149) respectively. Which goes to prove that the Prices Surveillance Authority inquiry into software pricing and the high profile that the BSAA has taken in defending US software publishers has had at least one good result: BSAA member companies are now duty bound to restrict the prices of their software to **close to US parity**, at least while they are under the spotlight.

Chris Bowes

ception that OS/2 was also developed in Australia, we have decided to remove the logo from the product'. Even Big Blue makes true-blue blues.



Geoff Thornton, of Queensland, has sharper eyes than the

rest of you. Looking at an advertisement for Atlanta motherboards, in March's *APC*, he spotted a new CPU manufacturer, letni. The letni 6831 processor and an IMA BIOS was fitted to an Atlanta motherboard. For not being backwards in coming forwards with this contribution, Geoff will soon be \$50 richer.

Coming up: *APC* July

Service and Reliability For the second year running, we asked you, our readers, about your experiences with the company behind the system you purchased and the reliability of your machine. Our research department has spent the last four months analysing the responses, and in June will present this year's results. This is essential reading for anyone in the market for a new PC, monitor or printer, and is the only such research you'll find anywhere in the country.

Accounting We commissioned Price Waterhouse to carry out extensive analysis and rigorous tests on high-end, multiuser accounting packages that run on a LAN.

Optical storage The new 3.5in rewritable optical drives are smaller, cheaper and quicker than their 5.25in predecessors. We test a selection of these products.

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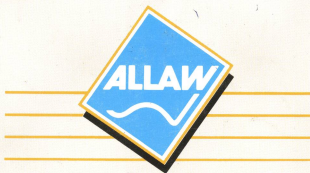
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